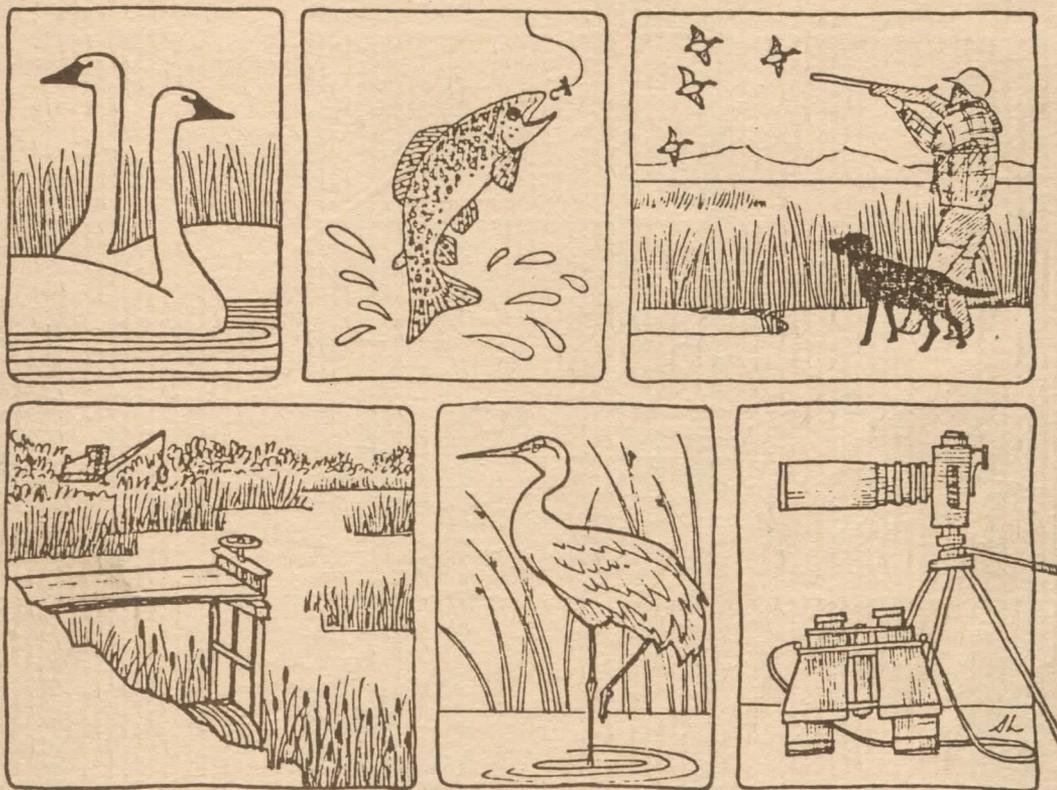


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# MALHEUR

## NATIONAL WILDLIFE REFUGE

### Master Plan/Environmental Assessment



Department of the Interior  
U.S. Fish and Wildlife Service  
Region 1

Malheur National Wildlife Refuge  
P.O. Box 72 Box 245  
Princeton OR 97721-9502

MALHEUR NATIONAL WILDLIFE REFUGE

MASTER PLAN  
and  
Environmental Assessment

REGION ONE, U.S. FISH AND WILDLIFE SERVICE

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Date Aug. 16, 1985

Assistant Regional Director-  
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[Signature]  
Date: 8/26/85

Acting Regional Director Approval

[Signature]  
Date: 9/10/85



## EXECUTIVE SUMMARY

This is the updated Malheur National Wildlife Refuge Master Plan and Environmental Assessment. It replaces the former Master Plan Technical Report that was prepared in March 1965.

The major purpose of this report is to update refuge objectives in accordance with a more current assessment of refuge resource capabilities and changes in applicable laws and policies affecting management of the National Wildlife Refuge System.

It should be noted that this Master Plan updating process was well along and many of the planning materials prepared prior to completion and issuance to the field of the Master Planning Workbook for the Refuge System in August 1980.

While we have made an effort to integrate the results of our earlier planning efforts into the procedures outlined in the Workbook, the format of our plan and planning materials is not the same in all cases.

The report also outlines in general terms the long-range management strategy that will be used in fulfilling revised refuge objectives. This is, by definition, a narrative statement of the management and development activities required to implement decisions made in master planning. It serves as the principle guide for developing detailed, short-term refuge management and operational plans.

Three alternative levels of management and associated strategies were developed and presented in this plan: No Funds Increase, Custodial Maintenance, and the Preferred Alternative.

The Preferred Alternative management strategy is the alternative the U.S. Fish & Wildlife Service feels would best satisfy wildlife resource and public needs, while remaining consistent with legal mandates, national direction, and the resource capabilities of the Refuge.

The Preferred Alternative is based on the assumption that funding will be available to permit a refuge operation that will ultimately produce the desired objective levels. Management would be directed at preserving natural environments of the refuge, maintaining aesthetic qualities, emphasizing habitat diversity, introducing native flora and fauna, maintaining an optimum mix of compatible public uses, and completing acquisition of about 3,681 acres of privately owned and 5,009 acres of public land adjacent or within the boundary of the refuge, on a willing seller or exchange basis.

The Preferred Alternative follows a comprehensive management approach, which prescribes that the Fish and Wildlife Service has an active interest and responsibility in helping to preserve the migratory bird

habitat associated with the entire Harney Basin. That responsibility recognizes the important role off-refuge lands play in support of total migratory bird habitat values of the Basin.

Under this alternative, use of livestock grazing, haying, prescribed burning, and other necessary management tools will be made, as appropriate to the needs of refuge habitats and animal population management programs.

The draft plan was released for public review and comment during the summer of 1983. Copies were distributed to Federal, State and local agencies, a wide variety of environmental groups, and local citizens. This final version was revised to address the comments and suggestions received from the public. Five written comments were received. All supported the Preferred Alternative.

As outlined in 4 RM 3, following the completion of the Master Plan, the refuge management planning process will move on to the development of unit-specific objectives and strategies. During this effort, master plan objectives and strategies will be matched to the innate potential of each unit to provide the optimum mix of outputs. Specific plans for comprehensive habitat, water, and public use management, will be developed as appropriate.

**Finding of No Significant Impact**  
**Master Plan and Environmental Assessment**  
**Malheur National Wildlife Refuge**  
**Harney County, Oregon**

The U.S. Fish & Wildlife Service has updated the Malheur NWR Master Plan which was prepared in March, 1965.

The major purpose of the Plan and Environmental Assessment is to update refuge objectives in accordance with a current assessment of refuge resource capabilities and changes in applicable laws and policies. The Plan and Assessment also outline in general terms the long-range management strategies that will be used in fulfilling revised refuge objectives. This Master Plan will serve as the principle guide for developing detailed, short-term refuge management and operational plans.

The FWS has analyzed and presented three alternative levels of management and associated strategies in this proposal: (1) no funds increase, (2) custodial management, and (3) the preferred alternative which outlines the staffing and funding levels necessary for the refuge to reach objective levels.

The preferred alternative was selected over the other alternatives because it would best satisfy wildlife resource and public needs while remaining consistent with legal mandates, national direction, and the resource capabilities of the refuge.

Implementation of the preferred alternative would be expected to result in the following environmental and social economic efforts:

- (1) Habitat Diversity: Habitat diversity would be optimized through water and vegetation management. Diversity of wetland habitats would be optimized through irrigation of wet meadows and pond level management. In addition, ponds would periodically be rehabilitated by drawdowns to maintain submerged plant vigor and diversity.

Upland habitat diversity would be optimized through various treatment practices which could include grazing, haying, farming, prescribed burning, fencing, and deferment from haying or grazing.

- (2) Wildlife Diversity: Wildlife diversity would be optimized by emphasizing habitat diversities consistent with the long-term strategy themes. With the exception of endangered, threatened or key sensitive species no single native wildlife species will be managed to the exclusion of another. Reintroduction of species which were once native to the Basin (e.g. river otter) will increase overall wildlife diversity above present levels.

- (3) Public Use Quality: Public use quality will increase with this alternative. Existing public use facilities will be rehabilitated and improved as needed. In addition, this alternative will provide new and expanded public use opportunities on the refuge, e.g., visitor contact station and interpretive museum at headquarters, interpretation of refuge historic sites, revised auto tour route, and new interpretive trails.

Public use will follow national and regional policy. Non-consumptive activities (wildlife observation, interpretation) will be emphasized over consumptive activities (hunting and fishing). Consumptive activities will emphasize quality (low user density, quietness, etc.) over quantity (maximized user density, artificial plantings of either birds or fish).

- (4) Wildlife Populations Quality: Overall wildlife population quality, measured by abundance, diversity, and health will be optimized through management directed to provide a diverse, yet balanced mix of habitats. Exotic species such as chukar, pheasants, and introduced fish will not be emphasized and may experience overall declines. Long-term management will emphasize reintroduction of once-native species such as river otter and Columbian sharp-tailed grouse.
- (5) Size and Shape of Refuge: This alternative would include completion of land acquisition (5,006 net acres) for the refuge. Acquisition will be on an exchange basis. This is not considered a significant change in refuge size. However, the refuge shape would change, though not drastically.
- (6) Economic Use: The present level of haying and grazing (40-60,000 AUMS/Year) will be maintained while the refuge staff develops Habitat Management Plans (HMP) for each unit. The HMP effort is scheduled to begin during 1985. If the HMP effort results in the need to increase or decrease economic use more than 10 percent, a separate Environmental Assessment will be prepared and subjected to a thorough public comment and involvement process and carefully coordinated with citizens, officials, and public agencies.
- (7) Fiscal Analysis: The Preferred Alternative involves the highest level of management intensity of the three alternatives discussed in this plan, and its monetary requirements are summarized.

Measures that are planned to mitigate or minimize adverse effects include:

- (1) Management on Malheur NWR will follow a holistic, ecosystem approach. Management decisions will not be made without giving consideration to the overall impacts on the integrity of the

Malheur-Harney Lakes Basin ecosystem. Conversely, the ecosystem approach dictates that refuge responsibilities extend beyond the refuge boundary to ensure that activities off the refuge (e.g., upstream storage reservoirs, power line right-of-ways, etc.) do not impact the integrity of the refuge. A continuing effort in this area will be made through coordination and open communication with private landowners and land management agencies in the Basin.

- (2) Management will emphasize a diverse mixture of habitats to benefit groups of wildlife that utilize those habitats. With the exception of endangered, threatened, or sensitive species which may have a critical dependence on Malheur NWR, land management will not emphasize a single species to the exclusion or major detriment of another. For example, predator control aimed at improving Sandhill Crane recruitment would be considered only if critical to meeting flyway and refuge objectives and the control effort would be as selective as possible.
- (3) Management will emphasize native or indigenous habitat diversity. Introduction of exotic plants and animals simply to increase habitat or wildlife diversity and abundance, will not be practiced. In addition, artificial structures such as wood duck boxes, nesting platforms, and other man-made contrivances will be discouraged unless they fill a critical need for a key species. No individual habitat will be managed to the complete exclusion of another. Thus, riparian zones will not be eliminated to facilitate irrigation nor will upland sagebrush-greasewood ecotones be inundated to create wetlands. Each habitat has its own values and it is the mixing and diversity of these habitats that will be emphasized.
- (4) Habitat management will emphasize, where practical, the use of natural ecological processes such as drought-flood cycles, prescribed fire, and grazing rather than intensive management through manipulative practices such as storage reservoirs, irrigation wells, and pesticides. Refuges in general, and Malheur NWR in particular, should be the premiere showcase of wildlife management and good land stewardship on public land.

The proposal is not expected to have any significant effects on the human environment because the objectives established and strategies and themes selected to reach objectives are not a significant departure from existing programs. Nor are they in conflict with established policy and national objectives for resource strategies presently in existence.

The Malheur NWR Master Plan and Environmental Assessment have been thoroughly coordinated with all interested and/or affected parties.

Therefore, it is my determination that the proposal does not constitute a major Federal action significantly affecting the quality of the human environment. As such, an environmental impact statement is not required. An environmental assessment has been prepared in support of this finding and is available upon request to the FWS facility identified above.

Reference: Malheur National Wildlife Refuge  
Master Plan and Environmental  
Assessment

Acting

  
Regional Director

9.10.85  
Date

Malheur National Wildlife Refuge  
Master Plan/Environmental Assessment

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# 1

INTRODUCTION

I. INTRODUCTION

A. General

The Malheur National Wildlife Refuge (NWR) is located in the Great Basin Region of southeastern Oregon. Shaped like a lopsided "T", the refuge spans an area 40 air miles long and 39 miles wide. Containing 184,124 acres, it is one of the largest of the nearly 400 units within the National Wildlife Refuge System. Refuge headquarters, on the south side of Malheur Lake marsh, is 32 miles southeast of Burns, Oregon, the nearest town. Elevation at headquarters is 4,100 feet above sea level.

The refuge was established primarily as production and maintenance habitat for migratory water birds by Executive Order of President Theodore Roosevelt in 1908. The 60,000-acre Blitzen Valley portion of the refuge was added in 1935, and the last large segment, the Double-0 Unit, was purchased in 1941.

Management objectives of the refuge are guided by the various laws discussed in greater detail in following sections, and the mission and objectives that have been established nationally for the National Wildlife Refuge System.

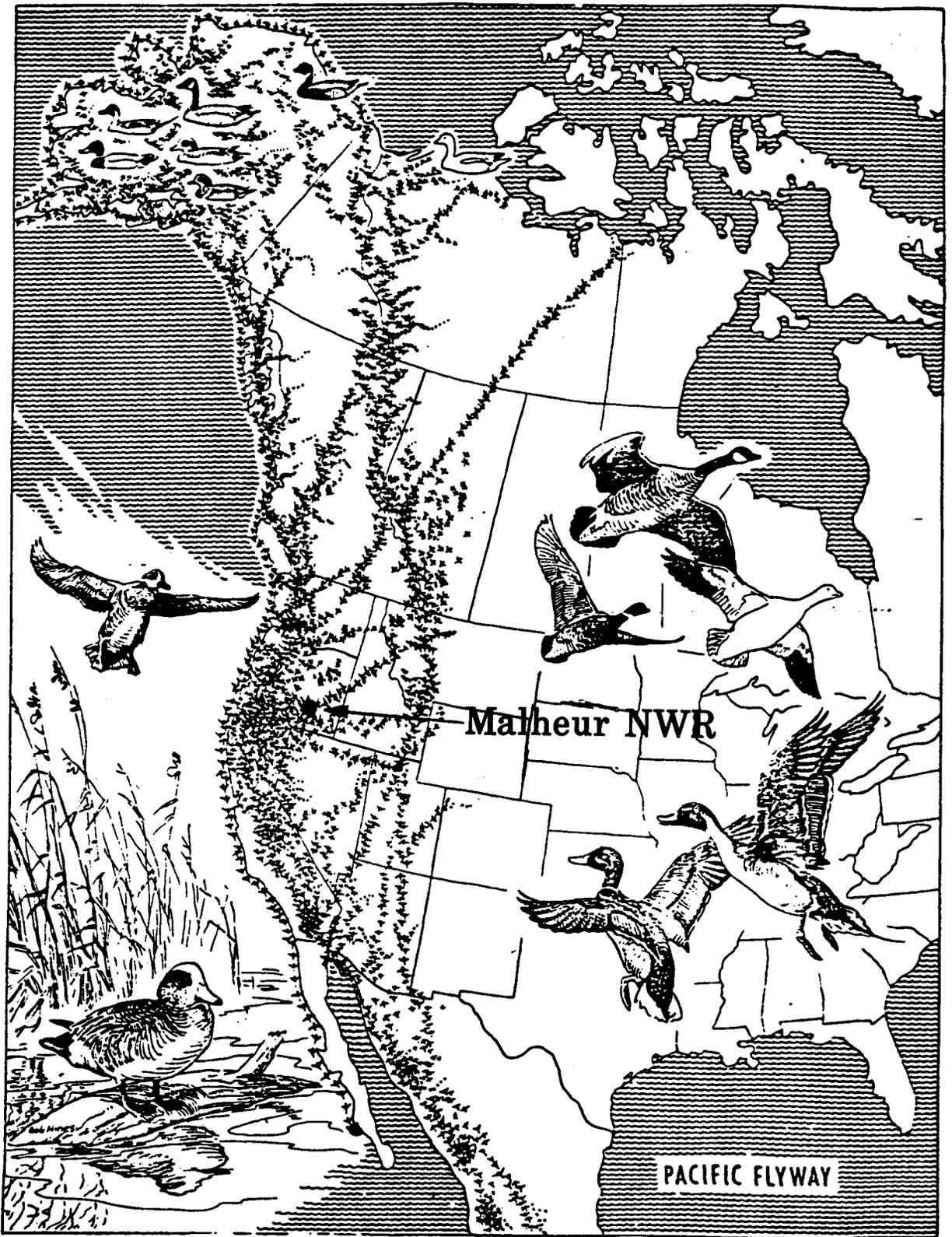
The special mission of the Refuge System is to provide, preserve, restore, and manage a national network of lands and waters sufficient in size, diversity, and location to meet society's needs for areas where the widest possible spectrum of benefits associated with wildlife and wildlands is enhanced and made available.<sup>(1)</sup>

Following are the broad goals of the Refuge System. They describe a level of responsibility and concern for the nation's wildlife resources for the ultimate benefit of the people. Their order of priority may be realigned to achieve management goals for specific refuges.

1. To preserve, restore, and enhance in their natural ecosystems (when practical) all species of animals and plants that are endangered or threatened with becoming endangered.
2. To perpetuate the migratory bird resource.
3. To preserve the natural diversity and abundance of fauna and flora on refuge lands.
4. To provide understanding and appreciation of fish and wildlife ecology and man's role in his environment, and to provide visitors with high quality, safe, wholesome, and enjoyable recreational experiences oriented towards wildlife, to the extent these activities are compatible with the purposes for which the refuge was established.<sup>(2)</sup>

(1) Refuge Manual: 2 RM 1.3

(2) Refuge Manual: 2 RM 1.4



Relationship of Malheur NWR to Pacific Flyway

1

# MALHEUR NATIONAL WILDLIFE REFUGE

## B. Regional Setting

Since prehistoric time, the Malheur-Harney Lakes Basin has been an important nesting and migration area for migratory birds, especially waterfowl, raptors, and marsh birds. The refuge and the Silvies River floodplain, together, are one of the most important migration and production areas in the Pacific Flyway.

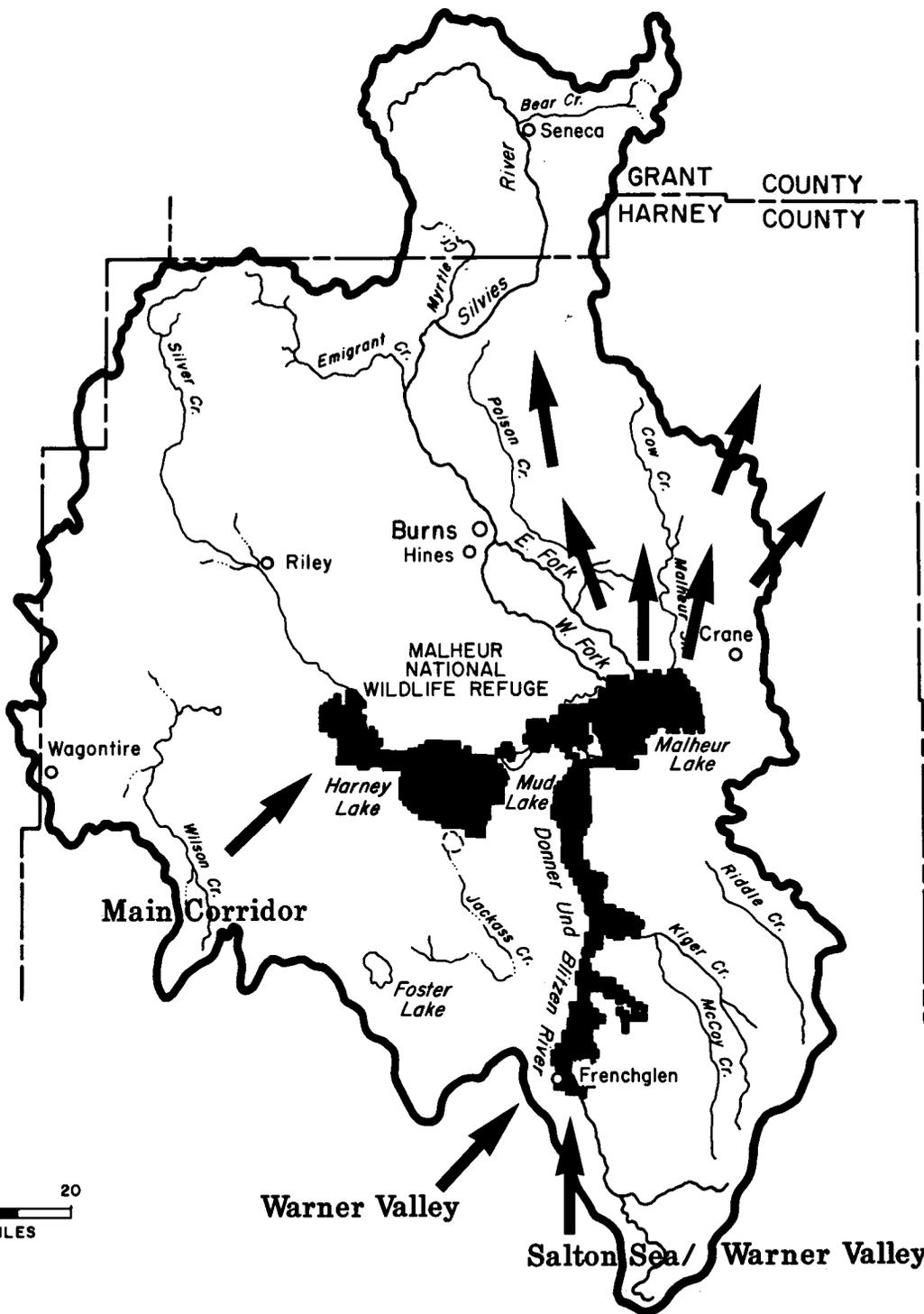
The spring waterfowl migration basically follows two routes into the Basin. The major route enters the south end of Warm Springs Valley, near the Double-0. Birds then move east to Harney and Malheur Lakes. From Malheur Lake, waterfowl move north and northeast to the largely privately owned Silvies River floodplain. The other minor spring route enters the Basin at the south end of the Blitzen Valley. These birds appear to use the desert route originating in Mexico. Early spring waterfowl use is concentrated on the open water areas (Double-0, Harney Lake, East Malheur Lake, and the floodplain between Burns and Crane). As more open water becomes available, the birds disperse to all suitable habitat within the Basin. During the four-year period, 1975-1978, average waterfowl use-days were 54 percent of the spring use on the private floodplain and 46 percent on the refuge.

Major Pacific Flyway concentrations of snow and Ross' geese, pintails, bald eagles, long-billed curlew and other shorebirds, and lesser sandhill cranes concentrate in the Basin during the spring migration. Concentrations of lesser sandhill cranes occur mainly on the Silvies floodplain.

The fall migration routes are similar to the spring routes. The major exception is lesser sandhill cranes. They shift their route to the west, passing on the west edge of the Basin, then heading southwest between Iron and Wagontire Mountains. The usual lack of water on the floodplain during this period causes use by waterfowl to shift dramatically to the refuge. During the four-year period 1975-1978, fall waterfowl use-days averaged 85 percent on the refuge and 15 percent off the refuge. Major Pacific Flyway concentrations of tundra and trumpeter swans, ducks and geese (especially redheads, canvasbacks, and Canada geese), shorebirds, and colonial nesting birds use the refuge in the fall (Table 1).

Table 1. Use-days (U/D) for migratory waterfowl, Malheur-Harney Lakes Basin. A comparison of refuge and private land.

<u>1975-1978</u>	<u>Spring U/D</u>	<u>(%)</u>	<u>Fall U/D</u>	<u>(%)</u>
Malheur NWR	22,807,500	(46)	30,264,600	(85)
Private flood plain	26,259,500	(54)	5,303,800	(15)
TOTAL	49,067,000		33,568,400	



**Legend**

**➔ Flyway Routes**

**Migratory Bird Migration Routes**

**2**

**MALHEUR  
NATIONAL WILDLIFE REFUGE**

Malheur Lake is used by 15 to 35 percent of the Pacific Flyway's canvasback population. Of those birds that winter in San Francisco Bay, over 35 percent have been seen on Malheur Lake at one time.

Malheur NWR represents a major production area in the Pacific Flyway. Malheur Lake, which is the heart of the refuge, is in actuality a shallow fresh water marsh, the largest in western North America. This marsh is especially important to diving ducks (redheads, canvasbacks, and ruddy ducks), colonial nesters (eared and western grebes, white pelicans, double-crested cormorants, great blue herons, great egrets, snowy egrets, black-crowned night herons and white-faced ibises), and associated marsh and shorebirds.

Malheur-Harney Lakes Basin is the second (15,000+) most important redhead production area in the west. Only the greatest concentration of redheads in the United States (130,000), which occurs in the marshes adjacent to the east and north sides of Great Salt Lake, surpasses the Malheur-Harney Basin (Bellrose 1976).

The large concentrations of prey also attract bald and golden eagles, and peregrine falcons.

The most recent information on the refuge's role in the Pacific Flyway was gathered by Chatten and Smith (pers. comm.) in 1965. They indicated Malheur is the most important refuge in Region 1 in terms of waterfowl production and other water-oriented birds. They reported Malheur annually produces approximately one-half the ducks and geese raised on Oregon's national wildlife refuges. They also indicated Malheur produces the following percentages of birds produced on national wildlife refuges in Region 1:

Trumpeter Swan . . . . .	33 percent
Grebe . . . . .	28 percent
Great Egret . . . . .	84 percent
Snowy Egret . . . . .	55 percent
Black-crowned Night Heron . . . . .	68 percent

From 1975-1978, roughly 33 percent (mean 13,368) of the waterfowl produced in the Basin was produced off-refuge. The refuge accounted for the other 67 percent (mean 27,297). The refuge also plays an important role in production of other species such as golden eagles, marsh hawks, American avocets, killdeer, greater sandhill cranes, American coots, cliff swallows, long-billed curlews, white-faced ibises, Franklin's gulls, bobolinks, loggerhead shrikes, common yellowthroats, yellow warblers, willow flycatcher's and Brewer's sparrows.

Record snowfall and unusually cool summers from 1980 to date have resulted in record flows down the Silvies, Blitzen, and Silver Creek drainages. This has caused significant damage to water management facilities in the Blitzen and Double-0 Units and raised the level of the

Malheur-Mud-Harney Lake system to historic high levels. As of July 1984, the three-lake system had reached the 4,102.4' msl level and the once famous Malheur marsh had all but disappeared. This recent phenomenon has greatly reduced the refuge's ability to reach objective levels and mandates extensive rehabilitation of refuge facilities before objective levels are to be reached.

C. Area of Ecological Concern

1. Natural Features

The area of ecological concern is that region which comprises an essentially complete ecosystem of which one part cannot be appropriately discussed without considering the remainder. For Malheur this area includes all the lands within the Malheur-Harney Lakes Basin (Figure 3). Known also as the Oregon Closed Basin, this region encompasses over three million acres of land that has no outlet to the sea. Virtually all drainage ends in Malheur and Harney lakes, which form a vital portion of the refuge's value to migratory birds.

The Malheur-Harney Lakes Basin is located in the northern extremity of the Great Basin. Three principal water sources drain the Basin. The Silvies River has its headwaters in the Blue Mountains, north of Burns, and drains 1,350 square miles, eventually emptying into Malheur Lake from the north. The Donner and Blitzen River heads on Steens Mountain at the southeastern extremity of the Basin, and drains a 1,000 square mile area. This system flows north from the mountain, through the Blitzen Valley, and empties into Malheur Lake from the south. Silver Creek flows from the Blue Mountains northwest of Burns and empties directly into Harney Lake, draining a 900-square-mile region. Harney Lake is the lowest point in the Basin and is a natural sump.

In years of high precipitation, Malheur Lake overflows westward into Mud Lake and eventually into Harney Lake. Malheur and Harney Lake are remnants of prehistoric Lake Malheur, which reached depths of nearly 60 feet during the Pleistocene epoch, which began about three million years ago.

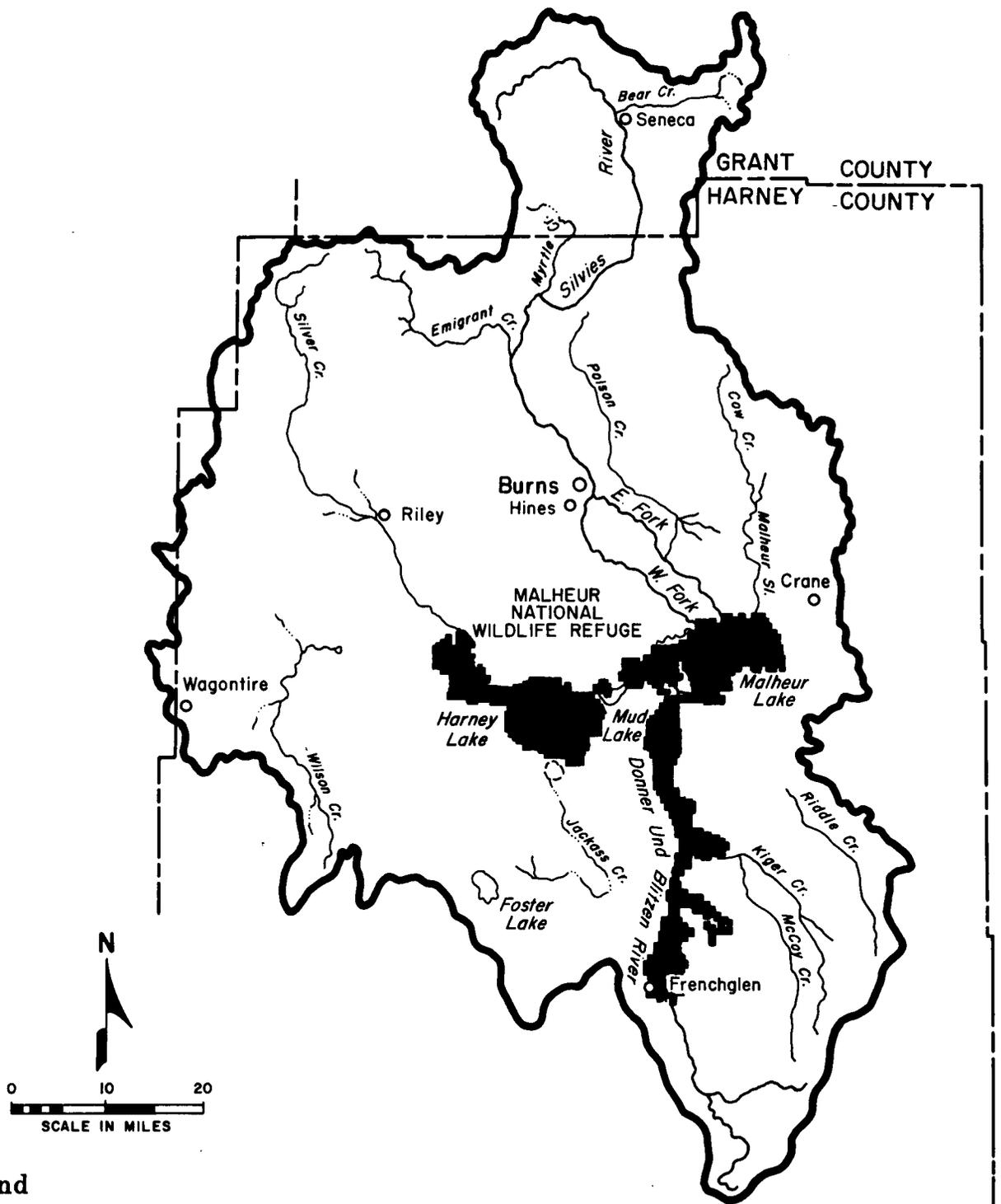
The northern portion of the Malheur-Harney Lakes Basin is mountainous and covered with coniferous forest. This portion consists of 779,400 acres of forest land, or 12.2 percent of the Basin total. Ninety percent is publicly owned, while ten percent is private. About 294,000 acres of rangeland are located in the mountainous region. At the lower elevations, western juniper (Juniperus occidentalis) and ponderosa pine (Pinus ponderosa) are the dominant overstory species and big sagebrush (Artemisia tridentata) the dominant understory species. At higher elevations Douglas fir (Pseudotsuga menziesii), western larch (Larix occidentalis), white fir (Abies concolor) and lodgepole pine (Pinus contorta) are important species. Numerous groves of quaking aspen (Populus tremeloides) are scattered throughout the mountain range, especially in moist areas.

In the southeast corner of the Basin, Steens Mountain rises to an elevation of 9,733 feet - the highest point in Oregon that can be reached by car. The mountain is a giant fault block 5,000 feet above the surrounding desert. Several glaciated U-shaped valleys, carved out during the Pleistocene epoch, are on the western slope of the mountain. The Blitzen River has its headwaters near the summit. Tributaries of the Blitzen River include Big Indian, Fish, Krumbo, McCoy, Cucamonga, Kiger, and Swamp creeks. About 128,000 acres drain into Diamond Swamp, 102,000 acres to the P-Ranch area, and 128,000 acres drain into the main channel of the Blitzen River south of Malheur NWR. Steens Mountain is barren of timber, except for stands of western juniper and aspen. Two small groves of white fir are present in Fir Canyon. At lower elevations, vegetation is of the typical semi-desert sagebrush-grass association, while the high rim areas are dominated by sub-alpine type grassland.

A low, flat area of more than 600 square miles, lying between the elevation of 4100 and 4150 feet, border Malheur and Harney lakes. About two-thirds lie north of Malheur Lake in the Silvies River floodplain. Northwest of Harney Lake, the Warm Springs Valley is of similar vegetation, consisting of both native and introduced meadow grasses and forbs. Some willows (Salix spp.) exist along channels and streams throughout these floodplains.

Surrounding this lowland are extensive regions of basaltic rimrock and rolling hills. Vegetation consists of semi-desert sagebrush-grass associations. In some areas greasewood (Sarcobatus vermiculatus) and rabbitbrush (Chrysothamnus spp.) are the dominant species.

Although not within the Basin itself, two regions should be mentioned. The Catlow and Alvord Valleys are similar to the lowland areas of the Basin and are important for migratory birds that move through this



**Legend**  
 ■ Area of Concern

**Area of Ecological Concern**

**3**

**MALHEUR  
 NATIONAL WILDLIFE REFUGE**

region. The Catlow Valley adjoins the Basin on the southwest and the Alvord Valley on the southeast. Both of these areas combined consist of 3,097,600 acres. Numerous small streams and springs supply water to isolated meadows of the Catlow. Several small streams empty into Alvord Valley from Steens Mountain and the Trout Creek Mountains.

Rocks forming the drainage basin are principally volcanic in origin. These are mostly basaltic and flow to 4000 feet in depth are exposed along the east side of Steens Mountain. Pluvial lakes occupied the lower sections of the Basin during Pleistocene times and resulted in deep sedimentary deposits. It was formerly drained by an outlet near Princeton, which became blocked by a lava flow. This, combined with reduced precipitation during the last 10,000 years, has resulted in the closed system.

Most of the lava present was deposited during the Miocene and Pliocene epochs. These lava flows are responsible for much of the present day topography.

The climate is variable. Temperatures in the mountainous region are colder than those in the lowlands. At Seneca, in the northern portion, for example, temperatures are 3 to 16 degrees cooler than in Burns.

The overall climate is semi-arid with short summers and long, rather severe winters. The average maximum January temperature in Burns is 35.7 degrees F., with an average minimum of 16.3 degrees F. Temperatures for July, the warmest month, are 86.2 degrees F. and 52.1 degrees F. Extreme temperatures are -40 degrees F. and 109 degrees F. There is a high proportion of clear, sunny days, with the percentage of possible sunshine very high in July and August (the driest months) and low during the winter months.

A large percentage of the precipitation falls as snow. This accumulates during the period of November through March. Annual precipitation varies from under 10 inches at lower elevations to over 70 inches in the mountains.

Most of the high desert varies around 5200 feet elevation, with the lowest point about 4080 feet in Harney Lake. The extreme lowest point is 4025 feet, just outside the Basin in the Alvord Desert.

Air quality is generally considered very good. Wind blown dust particles are sometimes severe in localized areas of the floodplains during wind storms. Range fires and flash burning result in increased atmospheric pollutants, especially in the fall months.

Lumber processing activities at the Snow Mountain Pine Company Mill occasionally results in localized impacts on air quality. Such activities usually occur at night and are not readily observable; however, during a number of days during the year, air pollution by the mill is certainly evident. During the winter, inversions often occur trapping smoke and dust.

Like the climate, wildlife is varied depending on the area that is being discussed. In the mountainous regions of the Basin, mule deer (Odocoileus hemionus) are found. In the lowlands and higher sagebrush zones, pronghorn antelope (Antilocapra americana) and mule deer are abundant. On Steens Mountain, mule deer abound and antelope occur in open situations. Along the east face of Steens Mountain California bighorn sheep (Ovis canadensis) have been reintroduced after disappearing from the Basin about 1911.

Of extreme importance is the use of the Basin by migratory birds. Waterfowl, marshbirds and shorebirds find ideal habitat for nesting and migratory use. Three migration routes converge on Malheur NWR. Pintails, snow geese, tundra swans, lesser sandhill cranes and others are dependent on the wet Basin lowlands for migrational use. Waterfowl, greater sandhill cranes, long-billed curlews, great egrets, and many other species find conditions suitable for nesting purposes.

Beaver (Castor canadensis) and muskrats (Ondatra zibethica) are abundant along streams and other water bodies. Mink (Mustela vison) and long-tailed weasels (M. frenata) occur throughout the wet meadows and near aquatic habitats. The coyote (Canis latrans) is one of the most common species and is found throughout the Basin, with a few bobcats (Felis rufus) occurring in the rimrock and other rocky situations.

This abundance of wildlife resulted in the Basin being occupied by paleo-Indians since about 13,000 years ago. Numerous paleo and recent Indian sites are found within the Basin.

The flood-irrigated native meadows attracted stockmen to the basin in the 1860's. Many abandoned homesteads, ranches and other structures remain from these original settlements.

## 2. Socioeconomic Features

Harney is the largest county in Oregon, consisting of 10,185 square miles. It was carved out of Grant County and named after Major General William S. Harney who commanded the Department of Oregon in 1858-59. He was instrumental in opening Eastern Oregon for settlement. The total population of the county was 7500 residents in 1976. Population and percent increase from 1910 to 1976 is presented in Table 2.

Table 2. Population growth in Harney County from 1910 to 1976

<u>Year</u>	<u>Population</u>	<u>Period</u>	<u>Percent</u>
1910	4059	-----	-----
1920	3992	1910 - 1920	-16.0
1930	5920	1920 - 1930	+48.3
1940	5374	1930 - 1940	- 9.7
1950	6113	1940 - 1950	+13.7
1960	6744	1950 - 1960	+10.3
1970	7215	1960 - 1970	+ 5.5
1976	7500	1970 - 1976	+ 4.0

Throughout the history of the county, the economy has been based largely on agriculture and the forest products industry. Agriculture includes livestock production and crop cultivation.

Ownership and land use in the Basin are presented in Table 3. A total of 73.6 percent of the land is federally owned.

Table 3. Approximate acreages of land ownership or administration for Malheur-Harney Lakes Basin (1)

Federal		
Nat. Forest	587,380	9.2
BLM & USFWS	4,107,890	64.4
State	224,750	3.5
Co./Municipal	13,000	0.2
Private	<u>1,444,580</u>	<u>22.7</u>
TOTAL	6,377,600	100.0

Most livestock raised are beef cattle. An abundance of water and native hay meadows are used extensively for this purpose. Developments have included water spreading, diking, and drainage improvements, but hay and pasture production still rely mainly on flood-irrigated native meadowlands.

(1) Includes Catlow-Alvord regions.

The refuge presently supports 40-60,000 AUMS of haying and grazing use annually. This is approximately a 40-60 percent reduction from the peak use-years of the late 1960's and early 1970's when virtually every available acre was annually hayed and grazed.

The reduction in haying and grazing was implemented gradually during the 1970's to provide better nesting and brooding conditions for nesting cranes, waterfowl and other ground nesting birds. Traditional haying dates were also set back from July 7-15 to July 25 to minimize a significant conflict with nesting birds. Haying was delayed an additional 10 days in fields where young sandhill cranes were known to exist in order to avoid mortality from haying equipment.

Various Homestead and Desert Land Act Legislation in the early 1900's encouraged dryland farming, but these proved uneconomical and by 1920 most had been abandoned. With the advent of sprinkler irrigation systems a new surge of land clearing and farming attempts was initiated in the 1970's. With the short growing season, commercial crops are limited generally to hardy varieties of alfalfa, wild hay, and spring grain.

A total of 779,400 acres are covered with forest. The largest employers within the Basin are involved in forest products processing.

Roads provide the primary means of transportation to and within the Basin. Two major highways converge near Burns. From east to west the area is served by Highway 20 that connects Ontario with Bend. From north to south Highway 395 connects John Day with Lakeview.

Beginning in Burns, Highway 78 goes southeast and terminates with Highway 95 at Burns Junction. Connecting Burns with Malheur National Wildlife Refuge is Highway 205, which eventually turns into a county road that terminates in Denio, Nevada.

The Burns Municipal Airport consists of two asphalt cross runways (150 by 5100 feet). It is located six miles east of Burns. Several additional small landing strips are located at isolated points in the county.

Union Pacific Railroad has a spur line that runs from a mail line in Ontario, Oregon, and terminates in Burns. This line provides triweekly freight service. During the spring of 1984 Malheur Lake flooded over several miles of rail line. This forced an official "embargo" of the line until lake levels recede.

Daily bus service is provided from Ontario and Bend by three eastbound and three westbound Continental Trailways buses. Commuter bus service was begun in 1979, with one bus daily to John Day.

Storage of water by impoundments for more timely and regulated use have been and will continue to be considered. A major dam on the Silvies

River has been proposed on two different occasions by the U. S. Army Corps of Engineers. In addition, the Oregon Water Resources Board has proposed a total of 23 potential water development projects on streams and rivers in the Basin. As with any semiarid area, water resources are of primary importance to virtually every socioeconomic activity. Since the Harney Basin is a closed system and Malheur and Harney lakes are the sump or potential final destination for all flowing waters in the Basin, any dam or water development has the potential to affect the timing, distribution, and amount of water that reach Malheur National Wildlife Refuge.

The recent flooding of 70,000 acres of private and public lands, roads, and rails by the three-lake system has caused an estimated \$32 million in damages and lost revenue to Harney County in 1984.<sup>(1)</sup> This has focused attention on structural and nonstructural solutions to the impacts of flooding. Considerable interest has focused on constructing an 18-mile flood relief canal that would route flood waters through a natural gap near Princeton, Oregon, into the Malheur River.

The value of Malheur NWR and the entire Basin to migratory bird maintenance and production is largely dependent on adequate water resources. Therefore, developments which affect the water resources of Harney Basin could have serious impact on migratory bird populations and consequently on the objectives of Malheur NWR.

Various minerals occur throughout. Gold, zinc, and magnetite have been mined north of Burns. Cinnabar, gold, and copper are found in small pockets on Steens Mountain and in the Pueblo Mountains. Most of these mineral deposits are small and have little potential for development. The U. S. Bureau of Mines, in 1965, reported that production of sand and gravel amounted to \$261,000. Principal activity at the present time is confined to cinders west of Hines and sand and gravel near Burns. A recent discovery of zeolite has the potential for development. Anaconda Mining Company has filed approximately 162 placer claims and 169 lode claims for strip mining a 3,380-acre area west and east of Highway 205, south of the Narrows.

Presently, Anaconda is trying to determine if the claim is feasible for bulk processing. Zeolite mining in this area could also affect a major migratory bird flyway that passes near the zeolite deposit. In addition, there is a potential for increased air pollution caused by mining operations.

1

(1) Harney Basin Flood, Legal, Economic, and Environmental Impacts Summary Report. Oregon Department of Agriculture, April 1984.

In addition, recent uranium deposits have been located southeast of the Alvord Desert in the Trout Creek Mountains. The deposits appear to be rich, and mining developments will probably be initiated in the future.

The Basin has numerous warm water springs, with the potential for geothermal development. Exploratory drilling has been extensive in the Alvord Desert and to a lesser degree south of Burns.

With the advent of sprinkler irrigation systems, several thousand acres of meadows and uplands have been cleared for agricultural crop development. Water quality in many of these clearings has been low due to dissolved salts, and feasibility of extensive development in these regions has not been determined. In meadow situations water is often pumped from existing channels and ditches. Water quality is good and the potential for draining native meadows, with subsequent planting of alfalfa and cereal grains, could occur in the floodplains.

Near the population centers of Burns and Hines there exists the potential for urban development into the surrounding floodplain. Harney County has actively participated in the urban growth planning for the two towns. The primary result has been the setting of Urban Growth Boundaries. This boundary will serve as the projected future limit to urban growth and will be the line which neither Hines nor Burns will annex beyond to provide services.

A large portion of the Basin, which includes one of the largest unaltered semi-desert regions in the United States, is undeveloped.

Recreational activity is increasing in the Basin and now ranks third in economic importance. A variety of uses are found, including nature studies related to wildlife, botany, and geology. Bird watching, rock-hounding, artifact collecting, photography, hunting, fishing, camping, hiking, and backpacking are other important activities.

Several local areas are sufficiently unique to present opportunity for attraction. These include Malheur Marsh, Steens Mountain, Blue and Pueblo Mountains, Diamond Craters, and Alvord Desert.



# 2

PLANNING DIRECTION

## II. PLANNING DIRECTION

### A. Land Status and Encumbrances

In 1895 the U. S. Government initiated the surveying of a meander line around Malheur, Harney, and Mud Lakes. This was known as the Neal Survey and established legal riparian boundaries for those persons who obtained "patents" from the government for surrounding lands. Those lands within the Neal Survey lines were formally designated by President Theodore Roosevelt on August 18, 1908, as Lake Malheur Reservation. Through Executive Order No. 929, the President set aside 81,786 acres as a preserve and breeding ground for native birds .

In the years following refuge establishment, the State of Oregon argued it had legal jurisdiction over those lands within the meander line of all navigable bodies of water within the state, including Malheur, Harney, and Mud Lakes. The State maintained the United States had given up all claim to those lands by virtue of abandonment when it had the meander line surveyed and issued patents on the surrounding lands. To quiet these claims the U. S. brought suit against the State on November 24, 1930. In 1935, the Supreme Court upheld a lower court ruling that the State did not have title under its navigability claim and that the United States had not abandoned any lands by issuing patents. Thus, the United States maintained its jurisdiction over the lakes.

In the interim, President Herbert Hoover had issued Executive Order No. 5891 on July 16, 1932, which temporarily withdrew public lands around Malheur and Harney Lakes for classification as to their suitability for migratory bird refuge purposes. An acreage figure was not specified, but plot locations were given. Executive Order No. 6152 issued by President Franklin Roosevelt on June 1, 1933, withdrew additional public lands for suitability study. This land was located west of Harney Lake and included the Silver Lake area.

President Roosevelt provided for an additional 64,717 acres with Executive Order No. 7106, issued on July 19, 1935, (the purchase was actually completed earlier on February 21, 1935, for those Blitzen River Valley lands between Frenchglen and Malheur Lake utilizing monies available under the "NIR Agriculture, Wildlife Refuges Fund"). The acquisition excluded much of the town of Frenchglen. Purchase of the land was made on a willing seller basis from Eastern Oregon Livestock Co. for the price of \$675,000. The company was given the use of 160 acres of land at the P-Ranch and all buildings thereon for a period of five years from the date of sale and the privilege of cutting 3,500 tons of hay annually for three years from date of sale.

Meanwhile, there was still much indecision over who owned those lands within the meander line of Malheur Lake. So, in December 1936 the U.S. filed suit against those landowners abutting the meander line to determine ownership of the lake bed.

The 9th Circuit Court of Appeals ruled in favor of the private landowners, but did not attempt to apportion the lands among those individuals involved. Consequently, the federal government continued to administer the lake area as a waterfowl refuge.

In 1937, the U. S. asked that Malheur Lake be placed in receivership until all land within the meander line was purchased or condemned. The courts complied and those funds received from permits for economic use of the refuge were held by a court appointed person until December 6, 1940. At that time, the receivership was dissolved as a result of another court decision upholding the ruling of private ownership.

The same Executive Order which provided for the Blitzen Valley purchase also stated that the refuge should be known as the Malheur Migratory Bird Refuge. Another Presidential Order, No. 2416 dated July 25, 1940, officially changed the name to Malheur National Wildlife Refuge.

The bulk of what is now known as the Double-0 Ranch Unit was originally acquired through lease agreement with the William Hanley Co. on March 28, 1940, at 12 cents per acre with an option to purchase the 14,751.48-acre tract at \$8.00 per acre. During the lease period the company reserved the right to graze 2,000 head of cattle for six months after date of deed.

Proclamation No. 2516 followed on October 1, 1941, and closed all lands within the meander line of Malheur and Harney lakes and the streams and waters connecting said lakes to the taking, capturing or killing, or attempting to take, capture, or kill migratory birds.

In an attempt to hasten some sort of court action which would define ownership boundaries within the meander line of Malheur Lake, a Presidential proclamation to close the lake to economic use was sought in 1941. The case did go to court again and on April 1, 1944, another court ruling was handed down in the case of the United States vs. Malheur Lake property owners (defendants were actually named on an individual basis). The Oregon U. S. District Court ruled that: 1) the original Neal Survey meander line was a valid survey of the lake boundary; 2) the Executive Order of 1908 establishing Malheur Lake Reservation was valid; and 3) the patentees of lands through which the Neal Survey line passed or bounded did have property rights which extended to the center of Malheur Lake. The court also defined the exact location of that centerline which ran generally east-west through the lake bed. The boundaries of those tracts claimed by the defendants were specifically laid out and designated as legally owned private tracts. It was ruled the government should compensate those landowners for use and occupation of the defendants' land since January 1937. No specific amount was set. Twenty-six people and estates were named as defendants in this case. At this time, work began on land exchanges, purchases and condemnations. A map showing these by color code can be found in the refuge map files as No. G-8.

In 1947, several trials were held in Burns on federal condemnation of four or five private tracts on Malheur Lake. The government had acquired similar tracts for \$10/acre and assumed a similar value would be set on those tracts which included the Hill Tract just west of refuge headquarters. During the trials, the landowners provided several witnesses for testimony who were potato farmers in the Klamath Falls area. Since the Malheur Lake land was similar to theirs, they convinced the court that its value was more like \$100/acre. The government felt that price was too high and dropped condemnation proceedings. This explanation of why the Hill Tract was never acquired prior to 1978 was provided on June 16, 1982, by Marcus Haines, former refuge employee and local historian.

A modification of the hunting closure on Malheur Lake came on October 20, 1948, through Presidential Proclamation No. 2818.

This made it possible to open portions of the lake to hunting (approximately 4241 acres). Proclamation No. 2859, issued on October 10, 1949, redefined those areas closed to hunting and again expanded that portion of the lake open to hunting. The hunting area was increased a third time by order of the Secretary of the Interior on October 21, 1953.

Malheur NWR was enlarged again on September 23, 1957, with Public Land Order No. 1511. It revoked Executive Orders numbers 929, 5891, and 6152 and amended No. 7106. It withdrew lands from public domain and exempted them from all forms of appropriation under the public land laws, including the mining, but not the mineral leasing laws, and reserved those lands under the jurisdiction of the Bureau of Sport Fisheries and Wildlife (U. S. Fish and Wildlife Service). The exact acreage was not given, but the boundary locations are shown.

The next Public Land Order concerning the refuge was No. 4641, issued by the Secretary on April 16, 1969. It deleted 4,021.15 acres of refuge lands in the Blitzen Valley area. These upland areas in small scattered tracts were deemed to be of limited wildlife value, and consequently, relinquished to Bureau of Land Management jurisdiction.

Another 199.9 acres of public domain was proposed for withdrawal for inclusion in the refuge on June, 7, 1979. These are BLM tracts on the east end of Malheur Lake. Notice of BLM State Office approval of the withdrawal application was received in February 1983. Final withdrawal action was completed during the fall of 1983.

A land status report of Malheur National Wildlife Refuge was filed by the Regional Supervisor, Division of Realty, U. S. Fish and Wildlife Service on January 24, 1974. The report lists most Executive Orders, rights-of-way easements and reservations of record in deeds on record at that time. An update to that report gives more detailed information on rights-of-way and reservations. Both reports are on file at Regional and Refuge Headquarters.

An encumbrance not previously mentioned is an agreement made with R. H. Emmerson and Son, of Arcata, California, under which the refuge constructed and maintains a road into Dunn Dam (S-1/2 Sec. 15, T27S, R31E) and performs routine maintenance on this structure in exchange for the right to manage the dam. In this agreement the U. S. grants rights of ingress and egress over the refuge-maintained road to the owners.

Three additional acquisitions have been made since that date. The first involved the so-called "Hill Tract" owned by Walt McEwen. This tract encompasses 1,518 acres within Malheur Lake marsh and is located northeast of refuge headquarters. That purchase was made through "friendly" condemnation where there was a willing seller, but a price agreement could not be reached. A declaration of taking was issued on December 11, 1978.

The second, an exchange involving the last two remaining private inholdings on Harney Lake and refuge uplands on lower Steens Mountain was officially completed on December 16, 1981. This involved the exchange of 950.36 acres of refuge lands for 480 acres of land owned by Dwight L. Hammond. The newly acquired lands had been fenced by the end of the year, resolving a long-standing problem with trespass, livestock, and cross-country vehicle travel that affected the entire 36,000 acres within the Harney Lake Unit.

An exchange involving 120 acres of refuge uplands on the northeast side of Malheur Lake for 80 acres of Bell-A Grazing Association's lands within the meander line of the marsh was completed in 1983.

These three acquisitions brought total refuge acreage to 182,974.70.

A Land Protection Plan (LLP) for the refuge was approved by the Director in September 1984. The Land Protection Plan presents a series of alternatives for consideration in implementing action to acquire approximately 3,681 acres of privately owned land and 5,009 acres of public land adjacent to and/or within the boundary of the Malheur NWR as additions to the refuge. Exchange is the primary means proposed for effecting this proposal with approximately 3,684 acres of refuge lands being identified as having exchange potential.

On December 12, 1984, owners of the Dunn Ranch and the Fish and Wildlife Service completed an exchange, whereby the Service traded 1,042 acres of less suitable refuge land for the approximately 2,459 acres of good wetlands. It was the only pending private exchange. Others may occur whenever the opportunity presents itself, and will be done on a willing and equal monetary value basis.

Exchanges and/or withdrawal of public lands, likewise, will occur on a mutually agreeable schedule as needs, desires, and workload of the agencies involved allows.

Some 3,684 acres of refuge lands (plus an undetermined acreage of other federal land within Oregon, in exchange for State property near the

refuge) would be divested, were all the transactions outlined in this LPP. Additionally, some 8,690 acres would be added (3,681 acres of private; 1,001 acres of State; and 4,008 acres of BLM), resulting in a net gain of 5,006 acres to the current 184,124-acre refuge.

All refuge lands are closed to oil and gas leasing by Secretarial Order (43 CFR Sec. 31.01.3-3). They are closed to geothermal leasing by terms of the Geothermal Steam Act of 1970 (PL-91-581).

The withdrawal orders that apply to the 57,778.58 acres of lands that have been added to the refuge through withdrawal from Public Domain withdrew those lands from the mining laws, but not the mineral leasing laws. However, these lands are protected from the latter by Secretarial Order mentioned above.

Following is a breakdown of refuge lands according to the type of acquisition:

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Table 4. Malheur NWR acreage by type of acquisition.

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<u>Type of Acquisition</u>	<u>Acres</u>	<u>Present Encumbrances</u>
Acquired by Purchase (willing seller)	84,154.	None
Acquired by Purchase (condemnation)	29,602.	None
Acquired by Exchange	6,775.	None
Lakebed Acquired (type acquisition unknown)	7,124.	None
Withdrawn from Public Domain (meandered lakebed)	56,469.	None
<b>TOTAL</b>	<b>184,124.</b>	<b>-</b>

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Three historic sites on Malheur NWR have been placed on the National Register of Historic Places. They are the P-Ranch, Sodhouse Ranch, and Double-0 Ranch. Information on these sites may be found in refuge files under Public Relations - Historical Sites. Copies of the National Register notices and complete site descriptions (bound in plastic covers) are in the station library. Generally, the sites include those

original buildings, corrals, etc. at their original headquarters locations. The first two ranches were placed on the register on January 29, 1979. The third site, the Double-0 Ranch, was placed on the register on October 25, 1982.

One area (the Malheur Refuge headquarters site) has been included in the Register as a significant archaeological site. Information on the site is available in the Public Relations - Historic Sites File, also. This site was placed on the register on April 30, 1979.

Stinking Lake (1,555 acres) and Harney Lake (30,000 acres) were approved as National Research Natural Areas by the Director on March 4, 1975. Both are located in the western portion of the refuge. Complete descriptions are available from the refuge file (Lands - Research Natural Areas). Grazing and recreational use have been excluded from these areas and each is managed for research, education, and related purposes with entry by permit only.

In 1973, two refuge areas, Harney Lake and Malheur Lake marsh, were specifically identified for possible inclusion in the wilderness system. The Secretary of Interior subsequently decided not to recommend Malheur Lake marsh for further consideration of wilderness status, but the Harney Lake wilderness proposal still awaits congressional approval. Additional information on these wilderness proposals can be found on file at Refuge Headquarters. Pending a final decision for future management of Malheur Lake marsh, it will be managed for preservation of its natural character. Harney Lake is being managed under "research natural area" status.

#### B. Legal Mandates and Policy Direction

Administration of the Malheur NWR is governed by legal acts pertaining specifically to establishment and management of the refuge: Congressional Acts and Treaties that relate to the administration of the National Wildlife Refuge System generally; national policies pertaining to the Refuge System; Regional policies; and local policies developed specifically for the Malheur Refuge program.

Information in these five categories felt to be relevant to development of this plan and the purpose and management of the Malheur NWR is summarized below. More detailed information is either appended or available in the refuge files.

Before proceeding with those discussions, it would be well to briefly review the series of events that led to Malheur's establishment and subsequently shaped its purpose and function within the Refuge System.

The migratory bird values of the Harney Basin were first recorded by Captain Charles Bendire while he was stationed at Fort Harney between November 1874 and May 1878. Bendire kept a diary and made detailed

reports of his observations. He published two papers describing his wildlife observations on Malheur Lake marsh in the proceedings of the Boston Society of Natural History in 1877. He later assisted the Smithsonian Institute in their surveys of the area.

Knowledge and interest in the marsh grew, and shortly after the turn of the century, two Oregon naturalists, William L. Finley and H. T. Bohlman, became concerned about the effects of plume hunting and other potential threats to the colonial bird species and other waterbirds associated with Malheur, Mud, and Harney lakes. Through their efforts, and with the assistance of the National Association of Audubon Societies for the Protection of Wild Birds and Animals, President Theodore Roosevelt was encouraged to issue the special executive order that created the refuge.

This coincided with a general recognition at the national level of the need for federal action to protect habitat critical to the needs of colonial nesting migratory bird species throughout the country. This concern was initially expressed with the establishment of the first unit of the National Wildlife Refuge System, the Pelican Island Refuge in Florida in 1903. The refuge was created to protect a colony of brown pelicans and other colonial nesting birds that were being threatened by killing for their plumage which was being sold to the millinery trade. Three more refuges were set aside by 1906, and in 1908, 36 refuges, including Malheur, were set aside, all primarily for the protection of colonial nesting birds. (1)

1. Executive Orders and Proclamations Concerning Establishment and Administration of the Malheur NWR

- a. Executive Order No. 929, dated August 18, 1908, by President Theodore Roosevelt - This was the act that initially established the refuge by reserving 81,786 acres on Malheur, Mud, and Harney Lakes, within the Neal Survey line, as a "preserve and breeding ground for native birds." It was called the Lake Malheur Reservation. The wording of the establishing order is so general as to leave some doubt relative to the species of "native birds" for which the refuge reservation was intended. However, information contained in the letter from Acting Secretary of the Interior Jesse E. Wilson, dated August 12, 1908, that presented the Order to the President for his signature, makes it very clear that the purpose and intent of that action was to preserve the habitat values of the three lakes for migratory waterfowl, and especially, the colonial nesting species.

(1) Waterfowl Tomorrow, Edited by Joseph P. Linduska, USFWS, 1964.

Prior to the enactment of the Migratory Bird Conservation Act in 1929, the reservation of land for fish and wildlife purposes took place through executive action and without any organic legislation defining the purposes for the reservation. In the pre-1910 period, "refuge" reservations were created by the President's implied power under Article II, Section 1 of the Constitution, subsequently upheld in *United States v. Midwest Oil*, 236 U.S. 459 (1915). By 1910, 44 Executive Orders had established bird reserves; 42 House Doc. 93 (1908); 43 House Doc, 44 (1909). These Executive Orders all generally used the same wording, that is, that the lands were, "...hereby reserved and set apart for the use of the Department of Agriculture as a preserve and breeding ground for native birds."

One thing should be kept in mind, however. Prior to the Migratory Bird Treaty Act, all wild birds were considered "native" in the sense of being subject to regulation by the states to the exclusion of the federal government. Accordingly, it has been concluded that the term "native birds" in this instance means "all wild birds frequenting the area, whether or not they inhabited the area on the date of the reservation."<sup>(1)</sup>

It also should be noted that the functions of the Secretary of Agriculture relating to the conservation of wildlife, game, and migratory birds were transferred to the Secretary of the Interior by the 1939 Reorganization Plan II and are now under the administrative jurisdiction of the Fish and Wildlife Service.

- b. Executive Order No. 5891, dated July 16, 1932, by President Herbert Hoover - Withdrew public domain lands around Malheur and Harney Lakes for addition to the refuge for "migratory bird refuge purposes".
- c. Executive Order No. 6152, dated June 1, 1933, by President Franklin D. Roosevelt - Withdrew additional public domain lands west of Harney Lake and in the Silver Lake area west of the Double-0 for "migratory bird refuge" purposes.
- d. Executive Order No. 7106, dated July 19, 1935, by President Franklin D. Roosevelt - This order formally made the 64,717-acre Blitzen Valley property acquired from the Eastern Oregon Land and Livestock Co., on February 21, 1935, a part of the refuge. The order specified that lands were for use "as a refuge and breeding ground for migratory birds and other wildlife".

(1) From Solicitor's Opinion #M-36914, dated June 25, 1979, concerning Federal Water Rights of the Fish and Wildlife Service, etc.

- e. Presidential Proclamation No. 2516, dated October 1, 1941, by President Franklin D. Roosevelt - Closed all lands within the record meander line of Malheur, Mud, and Harney Lakes to hunting of migratory birds.
- f. Presidential Proclamation No. 2818, dated October 20, 1948, by President Harry S. Truman - Excepted approximately 4,241 acres on Malheur Lake from the area closed by proclamation No. 2516, for the purpose of providing a public hunting area.
- g. Presidential Proclamation No. 2859, dated October 10, 1949, by President Harry S. Truman and Secretarial Order, dated October 16, 1953, by Acting Secretary of the Interior Ralph A. Tudor - further expanded the Malheur Lake public hunting area. The remainder of the original refuge area established in 1908 remained closed to hunting by Presidential Proclamation No. 2516 until November 19, 1982. On that date, the proclamation closures were eliminated and now no longer serve as a legal constraint to waterfowl hunting.

It is clear that the Malheur Refuge was established and is to be managed for the benefit of migratory birds, with emphasis on [colonial nesting species and waterfowl] in that order of relative importance.

2. Congressional Acts, Treaties and Other Legal Acts That Relate to Administration of the National Wildlife Refuge System

The "Final Environmental Statement on Operation of the National Wildlife Refuge System", published by the Fish and Wildlife Service in November 1976, provides an excellent summary of the legislative history of the Refuge System and the manner in which the various legislative authorities associated with its administration evolved.

Following is a list of principal legislation affecting administration of the National Wildlife Refuge System that is relevant to management of the Malheur NWR and the formulation of this plan.

An excellent summary of these various pieces of legislation is contained in the Final Environmental Statement on Operation of the National Wildlife Refuge System, on file in the refuge library.

- a. Lacey Act of 1900, as amended (16 U.S.C. 701).
- b. Antiquities Act of 1906 (16 U.S.C. 431).
- c. Migratory Bird Treaty Act of 1918, (16 U.S.C. 703-711) as amended.
- d. Migratory Bird Conservation Act, (1929) as amended. (16 USC 715-715s).

- e. Migratory Bird Hunting Stamp Act of 1934, (16 USC 718-718h) as amended.
- f. Fish and Wildlife Coordination Act, (1934) as amended (16 USC 661-666c).
- g. Historic Sites Act of 1935 (16 U.S.C. 461).
- h. Convention Between the United States of America and the Mexican States for the Protection of Migratory Birds and Game Mammals, (1936) (50 Sta. 1311).
- i. Convention of Nature Protection and Wildlife Preservation in the Western Hemisphere, 1940 (56 Sta. 1354).
- j. Fish and Wildlife Act of 1956, as amended (16 USC 742-742j).
- k. Refuge Recreation Act, as amended, (Public Law 87-714.76 Sta. 653; 16 U.S.C. 460k to 460k-4) September 28, 1962.
- l. Refuge Revenue Sharing Act of 1964, (16 U.S.C. 715s) as amended (PL-95-469, approved 10/17/78).
- m. Wilderness Act of 1964 (16 U.S.C. 1131-1136).
- n. Land and Water Conservation Fund Act of 1965, as amended (16 U.S.C. 460L-4 to 460L-11).
- o. Department of Transportation Act, (1966) (P.L. 89-670).
- p. National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee).
- q. National Historic Preservation Act of 1966 (16 U.S.C. 470).
- r. National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321-4347).
- s. Protection and Enhancement of Environmental Quality Executive Order of 1970 (Executive Order 11514, dated March 5, 1970).
- t. Environmental Education Act of 1970 (20 U.S.C. 1531-1536).
- u. Use of Off-Road Vehicles on the Public Lands Executive Order of 1972, as amended (Executive Order 11644, dated February 8, 1972, as amended by Executive Order 11989, dated May 24, 1977).
- v. Endangered Species Act of 1973 (16 U.S.C. 1531-1543).

w. Wild and Scenic Rivers Act of 1975 (16 U.S.C. 1271-1287).

While there are no rivers within the Malheur NWR that could qualify for consideration under this Act, that portion of the Blitzen River from Page Dam upstream to Blitzen Crossing has been identified by the State of Oregon as a candidate study area under this Act. Possible implications for the refuge involve such things as non-point pollution and preservation of watershed values.

x. Floodplain Management Executive Order of 1977 (Executive Order 11988, dated May 24, 1977).

y. Wetlands Preservation Executive Order of 1977 (Executive Order 11990, dated May 24, 1977).

z. The Soil and Water Resources Conservation Act of 1977 (P.L. 95-192, 91 Sta. 1407, dated November 18, 1977).

aa. The Archaeological Resource Protection Act of 1979 (P.L. 96-95, 93 Sta. 721, dated October 31, 1979)

3. National and Regional Policies Relating to Administration of the Malheur NWR.

National policy guidance for the refuge system is contained in the Refuge Manual. More specific Regional policy guidelines are provided in Regional Resource Strategy Plans and Policy Update Releases. Both sources are kept on file at the refuge office.

4. Formal Policies Relating Specifically to Administration of the Malheur NWR.

There are currently no formal refuge policies that are germane to the development of this plan.

C. Water Rights

Water management on the refuge is influenced, and constrained to some extent, by established, adjudicated water rights, especially in the Blitzen Valley and Double-0 units of the refuge. Details are contained in a document entitled, "Report on the Water Rights, Water Supply, Water Distribution and Water Use of the Malheur National Wildlife Refuge, Oregon", dated September 1962, and on file at the refuge.

It is important to note that, while the U. S. Fish and Wildlife Service has never exercised its claim on federal reserve water rights, such rights do apparently apply at Malheur. The application of these rights to areas administered by the Fish and Wildlife Service is discussed in

detail in Solicitor's Opinion #M36914, dated June 25, 1979, entitled "Federal Water Rights of the National Park Service, Fish and Wildlife Service, Bureau of Reclamation and the Bureau of Land Management", a copy of which is on file at the refuge and in the Regional Solicitor's Office, Portland, Oregon.

In effect, this opinion indicates that a federal right to sufficient water "reasonably necessary to fulfill the purposes of the refuge", was implied in the establishing acts. This obviously has extremely important implications for the federal government's ability to continue, in perpetuity to successfully manage Malheur for the purposes intended and diversion on the Silvies River, and continuing local efforts to make more "efficient": and therefore, consumptive use of water on the Silvies and on Silver Creek.

D. Malheur Field Station

The Malheur Job Corps Conservation Center, which was located on refuge lands approximately four miles west of refuge headquarters, was officially closed on June 30, 1969. Arrangements were subsequently made to have Pacific University, Forest Grove, Oregon, take over administration of the facility as an educational field station, which later became known as the Malheur Field Station.

The Service granted the University use of the lands involved by cooperative agreement extending for a period of 15 years from the date of execution on June 12, 1972. That agreement was later amended by Cooperative Agreement No. FWS 140-16-0001-82122, dated August 23, 1982, which was in effect for a period of 15 years from the date of signing. The amendment was prompted by the need for more definitive guidelines to facilitate the cooperative relationship that exists between the Station and Malheur NWR.

On January 17, 1984, the cooperative agreement was again amended to extend the period of use to 50 years or until August 23, 2032. This amendment was requested by the University to give their newly established "Friends of Malheur" benefactor program the type of stability that would attract private and corporate donations and support.

The buildings, structures and other facilities associated with the former Job Corps Center were transferred to Pacific University by an Agreement of Sale by the Department of Health, Education, and Welfare, which ended up with ownership of the facility when the program was terminated. That Agreement became effective on July 29, 1971, and provided for transfer of legal title to the facilities to Pacific University at the end of a 15-year use period (or on July 30, 1986). This 15-year use period was established to permit the University to amortize a 100 percent public benefit allowance on the \$714,000.00 fair market value of the property. A copy of all agreements and amendments pertaining to the Field Station are on file at the refuge office.

The practical effect of these agreements is to establish a permanent university educational and research facility and program on refuge lands, until such time as the University may elect to terminate that program and dispose of the facility. This necessarily mandates a close, cooperative working relationship between the refuge and the University, and inclusion of the Field Station program in the development of refuge objectives.

# 3

RESOURCE INVENTORY  
AND ANALYSIS

### III. RESOURCE INVENTORY AND ANALYSIS

This part of the planning process involves reevaluating the specific outputs and facilities that may be produced or needed on the refuge and determining the refuge's capability for producing the various outputs. This provides a basis for the objective setting phase that follows.

#### A. Output Location Criteria

Locational criteria describe the various land resource conditions that are required for the production or location of a given output or facility. The output analysis performed by the Master Planning Team selected outputs which it was felt required location criteria. A total of 26 criteria were prepared for wildlife outputs, and 14 for public use outputs.

Locational criteria help define those refuge resources that need to be inventoried, and, in conjunction with that resource information, serve as a basis for assessing the refuge's output production capability.

#### B. Refuge Resources

Six different types of natural and cultural resources information was considered essential to the planning decision-making process. This information was inventoried for each of the five refuge planning units (Figure 7) and mapped on acetate overlays. These maps, as well as backup documentation, are on permanent file in the refuge office. The six types of maps are discussed in greater detail below.

##### 1. Soil Associations

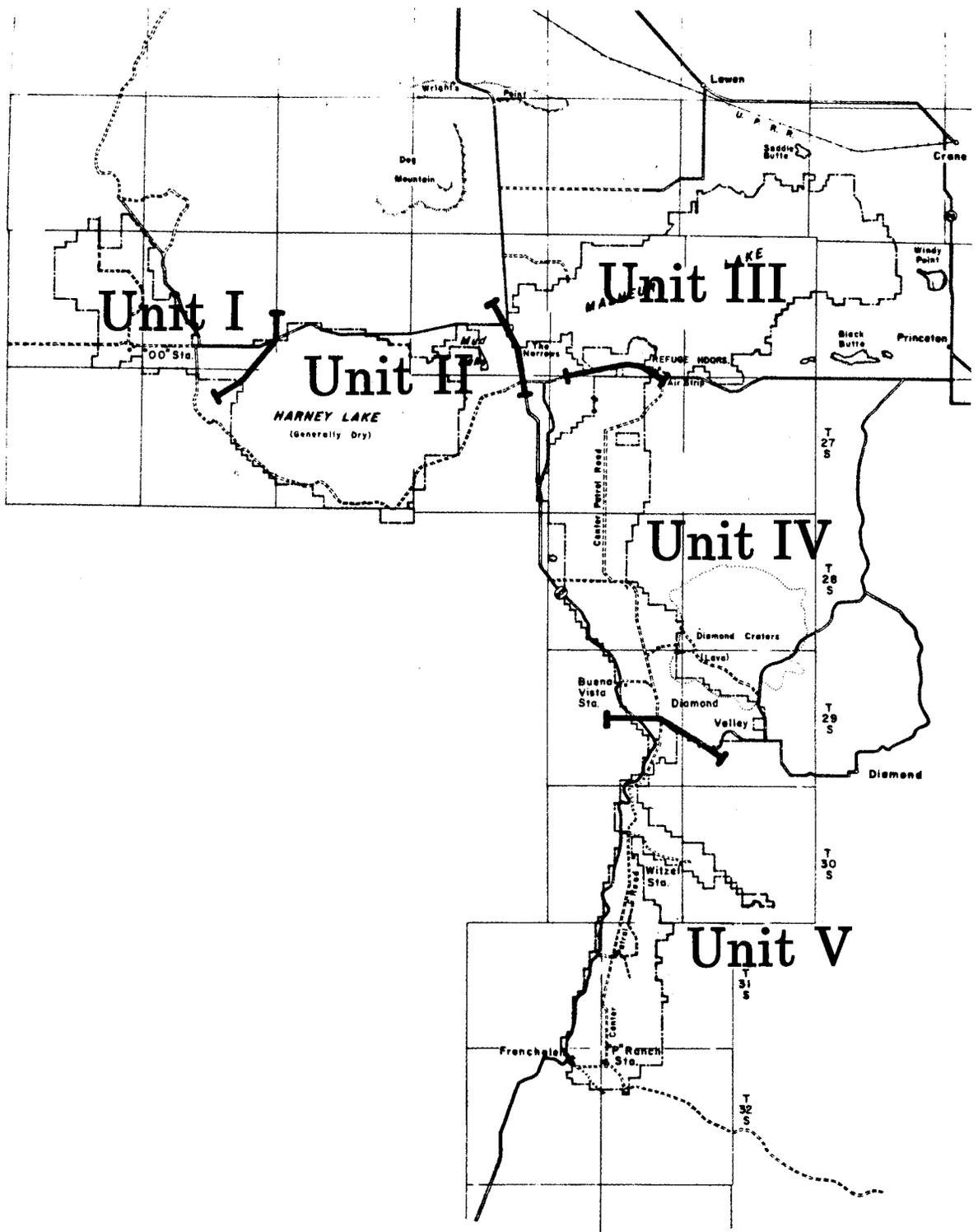
Detailed soil surveys are not available for refuge lands. The source for the general type of soil data that are available and that are mapped in the document, Oregon's Long-Range Requirements for Water (1967), published by the Oregon State Water Resources Board.

While this information is quite general, both the soil and topographic (slope) data mapped from this document are considered generally adequate for Master Planning purposes.

##### 2. Vegetative Associations

Information for the maps of vegetative associations was taken from the vegetation survey conducted by Biologist Charles Rouse during 1960-61. Aerial photos taken in 1958 were used in his survey.

Field work indicated changes in plant species had occurred in some areas of the refuge since Rouse's survey and there was a need to update it. However, monetary constraints made it necessary to use the information on hand.



Planning Unit Locations

4

**MALHEUR**  
**NATIONAL WILDLIFE REFUGE**

For general planning purposes, the existing information is probably acceptable. The more detailed annual management plans will eventually require more current vegetative information. For that reason, efforts will continue to secure funds necessary for vegetative survey update.

Rouse's vegetative type mapping was felt to be far too detailed for planning and overlay mapping purposes, so they were lumped into nine basic categories and the plant associations they include are as follows:

Saltgrass: Association of Saltgrass.

Meadowgrass: Primarily associations with beardless wildrye, bluegrass, carex, and juncus as the dominant plant species.

Upland grass: Primarily associations with crested wheatgrass and great basin wildrye as the dominant plant species.

Cropland: Ground used for planting cereal grain crops.

Alkali shrub: Associations with greasewood, saltbrush, and hopsage as the dominant plant species.

Upland shrub: Associations with sagebrush and rabbitbrush as the dominant plant species.

Trees: Groups or windbreaks of trees and willow thickets.

Marsh: Associations with burreed, cattail, bulrush, and submergents as the dominant plant species.

Barren: Areas of open alkali flats, open water, and barren rock.

A summary of resultant vegetative information for each planning unit follows.

a. Unit I - Double-0

The vegetation in this unit is dominated by alkali shrub, which represents just over 30% of the cover on this area. Meadow grasses make up the next largest category with 25% of the cover. These two are followed closely by upland shrub and saltgrass.

Table 5. Acreages of vegetative types in Unit I - Double-0.

<u>Vegetative Type</u>	<u>Acres</u>
Saltgrass	2,300
Meadow Grass	4,727
Upland Grass	212
Cropland	308
Alkali Shrub	5,826
Upland Shrub	3,710
Marsh	1,100
Trees	20
Barren	923
<b>TOTAL</b>	<b>19,126</b>

b. Unit II - Harney-Mud Lake

This unit is dominated by Harney Lake, which comprises 65% of the unit.

Mud Lake is currently ditched and drained for agricultural purposes as most of it is privately owned. In a restored condition, this marsh would resemble the marsh conditions in Malheur Lake.

The uplands in both areas are dominated by saltgrass and alkali shrub.

Table 6. Acreages of vegetative types in Unit II-Harney-Mud Lake

<u>Vegetative Type</u>	<u>Acres</u>
Saltgrass	1,207
Meadow Grass	203
Upland Grass	---
Cropland	785
Alkali Shrub	10,859
Upland Shrub	416
Marsh	153
Barren	31,041
<b>TOTAL</b>	<b>44,664</b>

c. Unit III - Malheur Lake

This unit is taken up largely by the bed of Malheur Lake. Roughly 85% of the unit is marsh in an average year (with the lake at 48,000 surface acres). Meadows around the lake (wet in high water years) account for another 4% and greasewood for most of the rest at 7%.

Table 7. Acreages of vegetative types in Unit III-Malheur Lake

<u>Vegetative Type</u>	<u>Acres</u>
Saltgrass	877
Meadow Grass	2,476
Upland Grass	996
Cropland	---
Alkali Shrub	3,822
Upland Shrub	160
Trees	6
Marsh	48,836
Barren	2
River	5
Roads	15
<b>TOTAL</b>	<b>57,195</b>

d. Unit IV - Lower Blitzen Valley

This area is largely sagebrush and meadows, with an interspersion of marshes. Greasewood uplands surround the fresh water associations on the east and west sides. Meadow grasses cover 26%, upland shrubs 33%, alkali shrubs 18%, and marshes account for another 15%. Upland grasses cover a mere 2% of this unit's area.

Table 8. Acreages of vegetative types in Unit IV-Lower Blitzen Valley

<u>Vegetative Type</u>	<u>Acres</u>
Saltgrass	555
Meadow Grass	9,314
Upland Grass	263
Cropland	1,208
Cropland/Marsh	366
Alkali Shrub	7,024
Upland Shrub	13,046
Trees	284
Marsh	5,775
Barren	11
Roads and Canals	194
<b>TOTAL</b>	<b>38,040</b>

e. Unit V - Upper Blitzen Valley

This unit is similar to Unit IV. It is a unit of near equal acreages of meadow (33%) and sage (32%), with scattered marshes (13%) bordered by some greasewood (5%). However, upland grasses (9%) show a significant increase here compared to Unit IV.

Table 9. Acreages of vegetative types in Unit V - Upper Blitzen Valley.

<u>Vegetative Type</u>	<u>Acres</u>
Saltgrass	327
Meadow Grass	8,888
Upland Grass	2,402
Cropland	202
Cropland/Marsh	607
Alkali Shrub	1,273
Upland Shrub	8,101
Trees	443
Marsh	3,479
Barren	190
Roads, Dike, Canals	
River	604
<b>TOTAL</b>	<b>26,516</b>

f. Summary of Units I-V.

The combined totals of all vegetative types in all planning units are shown in Table 10.

Table 10. Summary of vegetative association acreages, Malheur NWR.

<u>Association</u>	<u>Planning Units</u>					<u>TOTAL</u>
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	
Saltgrass	2,300	1,207	877	555	327	5,266
Meadow Grass	4,727	203	2,476	9,314	8,888	25,608
Upland Grass	212	---	996	263	2,402	3,873
Cropland	308	785	---	1,208	202	2,503
Cropland/Marsh	---	---	---	366	607	973
Alkali Shrub	5,826	10,859	3,822	7,024	1,273	28,804
Upland Shrub	3,710	416	160	13,046	8,101	25,433
Trees	20	---	6	284	443	753
Marsh	1,100	153	48,836	5,775	3,479	59,343
Barren	923	31,041	2	11	190	32,167
Roads-River	---	---	20	194	604	818
<b>TOTAL</b>	<b>19,126</b>	<b>44,664</b>	<b>57,195</b>	<b>38,040</b>	<b>26,516</b>	
<b>GRAND TOTAL</b>						<b>185,541</b>

3. Water

Standard water and marsh classification systems did not lend themselves to the situation at Malheur, nor to the information needs identified in the locational criteria. For that reason, a water classification system was developed that was felt to be most appropriate to refuge conditions, and that would provide the kind of information needed for subsequent output capability assessments. Water resource inventory overlay maps were prepared on the basis of that system, which is illustrated in Table 11.

Acres in the Seasonal Water and Canal Water classifications vary so drastically from year to year depending on runoff conditions, that no effort was made to calculate them. Approximate acreages in the Semi-permanent and Permanent classification categories are listed in Table 12.

4. Water Rights

Water rights information contained in "Report on the Water Rights, Water Supply, Water Distribution and Water Use of the Malheur National Wildlife Refuge", published in September 1962, by the USFWS, was transferred to acetate overlay planning maps so that it could be properly considered in the decision-making process.

That report is an excellent reference for detailed information about refuge water rights. In addition, copies of all irrigation water court adjudications involving refuge waters are on file in the refuge office.

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Table 11. Water Classification System, Malheur NWR.

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SEASONAL WATER - Water that remains in channels, behind spreader dikes, in shallow marsh and as standing water in fields for a relatively short period of time. Normally dry by mid- to late summer, with little or no opportunity to influence availability during this drying period.

SEMI-PERMANENT WATER - Water over which there is normally some opportunity to influence availability beyond the mid- to late summer period, in two categories.

1. Annually Dewatered - A pond, channel, or marsh that retains water beyond mid- to late summer, but is normally dry by October 1. Little or no opportunity to prolong water availability beyond October 1.

2. Periodically Dewatered - A pond, channel, or marsh that can normally be controlled to maintain water for an indefinite period of time during the year. Dewatered at times to maintain pond vigor, control rough fish and spread of emergent vegetation.

PERMANENT WATER - Springs, ponds, or marsh areas that cannot be directly controlled and that maintain water year round, except during extreme drought years.

CANAL WATER - Constructed waterways used to maintain ponds, channels and marsh.

POTENTIAL WATER DEVELOPMENT - Sites for possible water impoundments.

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Table 12. Acreages of Semi-Permanent and Permanent Water, Malheur NWR. (1)

<u>WATER AREA</u>	<u>ACREAGES</u>
<u>Unit I</u>	
Rock Island Unit	200
Chappo Pond	18
*Stinking Lake	752
Derrick Lake	300
Martha Lake	25
Warbler Pond	270
*Double-0 Springs	23
*Barnyard Spring	1
Dune Pond	23
Willard-Hughet Channel	75
Tule Pond	28
Carp Pond	42
SUBTOTAL:	
	1,757
<u>Unit II</u>	
*Harney Lake	29,666
*Areas within Harney Lake Bed	
west marsh	153
*Harney Lake Hot Spring (lower pool)	16
Saltgrass Playas	
Refuge	734
Proclamation	186
Proclamation Lands	1,164
Off-Refuge Marsh	
(T27S, R30E, Sec. 3)	75
Narrows Channel	73
SUBTOTAL:	
	32,067

Unit III

Malheur Lake is variable and figured at 48,836 by Rouse during his survey. Maximum in recent years was 80,000+ in the spring of 1984. Many meadow, brush, and saltgrass areas were inundated at that time. McLaury figured the following acreages in the Refuge Wildlife Inventory Plan.

*Biological Unit:	#4	#5	#6
Marsh	5,325	13,400	2,475
Water	1,475	6,640	4,600
	6,800	20,040	7,075

SUBTOTAL: 33,915 ACRES

(1) Those preceded by an asterisk were classified as Permanent water.

Table 12. Continued

Unit IV

Sodhouse Pond	6
Wright's Pond	136
Big Sagebrush Pond	4
Horseshoe Pond	7
Pintail Pond	15
McLaughlin Slough	25
Stubblefield Pond	15
Unit 8 Duck Pond	83
S-Curve Pond	20
Buena Vista Pond	285
Oliver Springs Slough	9
Unit 9 Pond	29
Skunk Farm Pond	11
Lava Bed Pond	7
South Swamp Channels	70
South Swamp Pond	8

SUBTOTAL: 730

Unit V

Rock Crusher Pond	1
Witzel Pond	20
Krumbo Reservoir	200
Upper Krumbo Pond	24
Krumbo Swamp	28
Crane Pond	5
Benson Pond	90
Dredger Pond	32
Boca Lake	320
Bailey Pond	36
Jones Pond	25
Darnell Pond	20
Gravel Pit Pond	3
W. Knox Pond	200
E. Knox Pond	220
Knox Swamp	100
Cottonwood Pond	65
Rail Pond	18

SUBTOTAL: 1,407

GRAND TOTAL 69,876

5. Designated Sites

The types of resources included in this category are extremely important to the planning process, since as a group they impose certain constraints on land use allocations, by virtue of the various laws and policies discussed in Subsection I-D.

- a. Archaeological Resources - Present information indicates that man has been present in the Great Basin for at least 11,000 to 12,000 years. It is also clear that his campsites are "almost universally found adjacent to Pleistocene lake shores and associated streams", such as Malheur and Harney Lakes, and their tributaries.<sup>(1)</sup> This undoubtedly explains why the refuge has such a wealth of archaeological resources and potential for archaeological interpretation. The inventory of refuge archaeological resources was based on the report, Archaeological Reconnaissance of the Malheur NWR, Harney County, Oregon: 1974, by Thomas M. Newman, et al., Portland State University. The report summarizes three years of field work conducted in 1972, 1973, and 1974, and is on file in the refuge office.

As part of this project, an archaeological site classification and significance rating system was developed as an aid to management. The 166 sites identified in the reconnaissance were classified and mapped in accordance with this system, which is illustrated in Table 11. A summary of the results of the resource classification is included in Table 13.

(1) Late Pleistocene and Recent Archeology and Geomorphology of the South Shore of Harney Lake by Keith D. Gehr. 1980.

Table 13. Archaeological Site Classification and Significance Rating System, Malheur NWR.

Site Types:

- I. Burial Sites - These are a special and extremely sensitive category, and are self-explanatory.
- II. Edifices and Structures - This type includes pictographs, (paintings on stone), petroglyphs (carvings in stone), habitation rings, house pits, game traps, and mounds. With the exception of mounds, these sites generally lack temporal depth, but do involve more or less permanent modification of the natural environment.
- III. Closed Sites - These sites are occupation areas that are defined by obvious natural boundaries. Included in this type are coves and rock shelters. These generally have vertical stratigraphy.
- IV. Open Sites - These are sites which by their nature have vague natural boundaries. Included in this type would be open-air camps, and large and small kill and butcher sites. These may or may not have vertical stratigraphy.

Site Significance: Ratings before many sites have been tested. Order of significance may change after testing.

**Immediate attention for testing or preservation**

- A. First order of significance: This is an extremely important site, or a burial site. These usually include: (1) rock shelters or habitation rings which have not been disturbed or only partially disturbed; (2) all pictographs and petroglyphs, especially ones that are weakening rapidly and need immediate attention; (3) open sites which appear, or have been determined by testing, to contain any of the following:
  - (a) a wide range of artifact types which would aid in attempts to determine complete representation of cultural assemblages.
  - (b) appear to have a large amount of artifactual remains.
  - (c) appear to have relatively good potential for temporal depth.
  - (d) appear to be relatively untouched and may, therefore, yield artifacts which are missing from sites that have been collected over. This category indicates great potential for yielding information of the pre-history of the refuge area or in some cases indicates unique and rare aspects of that pre-history.

**Keep watch on them for present.**

Table 13. Continued

B. Second order of significance: These are sites that would ordinarily be included in first order of significance, but are remote, and therefore, not in immediate danger from amateur collectors.

Test as soon as possible.

C. Third order of significance: This is an important open site but they appear to lack the four distinctive features of open sites included in first order of significance. These are solid sites and taken all together will probably provide the core for any comprehensive study of the pre-history of the area. These sites should be tested as soon as possible.

Maybe test at a later date.

D. Fourth order of significance: These sites appear to have moderate potential for yielding data, either as a result of destruction or simply because of site. This category may include sites which never were very significant, i.e., chipping station. Indicates that maybe they should be tested at some later date. These sites should be rechecked before any construction is planned on them.

No action.

E. Fifth order of significance: Relatively no potential as a result of destruction.

Summary of Results: Archaeological Resources Site Classification and Significance Rating, Malheur NWR.

		<u>CONCLUSIONS</u>		<u>CONDITION*</u>		
Type	Type Explanation: Particulars	Number Recorded	Excellent Good	Fair	Poor	
I.	1. Number of burial Sites	2				2
II.	2. Pictographs	4	1	2		1
	3. Petroglyphs	5	2	1		2
	4. Habitation rings	7	1	4		2
III.	5. Rock Shelters	15	6	5		4
IV.	6. Open Sites - large	81	16	40		25
	7. Open Sites - small	52	13	26		14

\*Condition Definitions:

Excellent-Very important material to be recovered, i.e., nature of stone rings, rock shelters, open site with wide range of artifact types, site suggests old material.

Table 13. Continued

Fair: Site may seem to be typical of area, or partially destroyed but seems to contain good amount of material and should be tested or information recovered.

Poor: Nothing left of value to recover - test prior to complete destruction.

- b. Historic Resources - The inventory of historic sites was based largely on an initial inventory conducted by refuge personnel in 1973. For the most part, this involved formally documenting information already available about well known historic places. The results of that effort are summarized in a booklet entitled 1973 Harney County Historical Society Tour of Malheur NWR Historic Places, which was prepared, as the title suggests, for a tour of the local Historical Society. That booklet also documents the Harney County Historical Society's first formal involvement with the refuge decision-making process as it relates to preservation and/or management of refuge historic resources, and is appended.

Also considered was information contained in three refuge documents entitled, chronologically, Sodhouse Ranch: History, Preservation and Interpretive Development, by Caryn Talbot, Malheur NWR, June 1975; P-Ranch - History, Preservation and Interpretive Development, by Caryn Talbot, Malheur NWR, 1976; and The Double-0 Ranch - Its History with Plans for Restoration, Interpretation and Development, by Wayne R. Hill, Malheur NWR, March 1978, all of which are on file at the refuge.

Based on these reports, the Sodhouse and P-Ranch sites were nominated and subsequently approved for listing on the National Register of Historic sites on January 29, 1979. The Double-0 site was approved for listing on October 25, 1982.

Archaeological site 35 HA 403, located at refuge headquarters, was placed on the National Register on April 30, 1979.

The major historic sites that need to be considered in land use allocations and management are as follows.

1. Planning Unit 1 - Double-0  
Double-0 Ranch
2. Planning Unit 2 - Harney/Mud Lake  
Harney Lake Sand Gap
3. Planning Unit 3 - Malheur Lake  
Sodhouse Site  
Theodosia Elliott Grave Site

4. Planning Unit 4 - Lower Blitzen Valley  
 Sodhouse Ranch  
 Peter French Murder Site  
 Rock Ford  
 Busse Dam Site  
 Nettie McLaughlin Grave Site
5. Planning Unit 5 - Upper Blitzen Valley  
 Brenton Cabin and Willow Corral  
 P-Ranch

- c. Geological Resources - The Harney Basin lies near the center of what Geologist Bruce Nolf, Central Oregon Community College, described as "one of the richest geologic areas in Oregon." Rich, in the sense of its geologic diversity and its potential for study of comparatively recent evidence of volcanism and the other natural forces that shaped this region.

Geologically, the refuge lies within the High Lava Plains Region, where it blends into the Basin and Range Region to the south. It's described as a relatively undeformed expanse of young lava flows dotted in places by cinder cones and lava buttes covered by sagebrush and, in places, by juniper.

The stratigraphy and geologic history of the Harney Basin is summarized by Piper, Robinson and Park (1939): "Five distinct stratigraphic units span the Miocene and Pliocene epochs. The oldest consists of siliceous extrusives of Miocene (?) age about 1,000 feet thick...The Steens basalt, of Miocene age, rests unconformably on the older siliceous extrusives in the marginal upland along the east half of the basin. Its maximum known thickness, about 3,000 feet, is exposed in the eastward-facing escarpment of Steens Mountain. The component layers average 10 feet in thickness; scoriaceous and fragmental zones are common at the top of each layer and afford considerable water-yielding capacity. The Steens basalt is overlain unconformably by the Danforth formation, of Pliocene age, which crops out extensively over the whole dissected upland and ranges in thickness between 20 feet and about 800 feet. In the northwestern part of the basin, the upper part of the Danforth formation comprises stratified siltstone, sandstone, tuff, and volcanic ash with a few intercalated layers of glassy rhyolite and one distinctive rhyolite tuff-breccia member. Its lower part is massive rhyolite...The succeeding stratigraphic unit, the Harney formation, of Pliocene (?) age, is about 750 feet thick and rests on the Danforth formation with angular and erosional unconformity. The Harney formation underlies an extensive plain of intermediate altitude in the west-central part of the basin and occurs in out-liers along all margins of the central district except the northern. The formation

includes massive basaltic tuff and breccia, sandstone, siltstone, some incoherent gravel, and a few layers of scoriaceous and massive basalt..."

Steens Mountain is Oregon's highest and scenically grandest fault-block mountain. It extends for about 50 miles and rises at its highest point to 9,733 feet above sea level.

At the southern edge of the Harney Basin lies an isolated area of recent volcanism known as the Diamond Craters. The lava that created this formation welled up and flowed out in radial distances from a now-hidden vent near the center. Slight irregularities in the topography of the area over which the coalescing tongues of the lava flowed created a design at the perimeter resembling "the scalloped edges of a lace tablecloth". These scalloped edges extend into the refuge about one-half mile.

The craters present many unusual features that apparently do not exist at any recent volcanic area in Oregon. For this reason, BLM has withdrawn the area from the mining laws, but not the mineral leasing laws. It is now managed for preservation and interpretation of its geologic values as the Diamond Craters Geologic Area. Close coordination and cooperation with BLM planning and administrative efforts will be required. The geology of the Diamond Craters is described in detail in the article Diamond Craters, Oregon, by Norman V. Peterson, et al., The Ore Bin, Volume 26, No. 2, February 1964.

There is considerable interest in the geothermal resources development potential of an area that extends generally northwest from near Diamond Craters to northwest of Harney Lake. Heat flow tests conducted by The U. S. Geological Survey and reported in 1976 (Progress Report on Heat Flow Study of the Brothers Fault Zone, the Ore Bin, Volume 38, #3, March 1976) indicate this area appears to have one of the highest source potentials for hot water in Eastern Oregon. Testing is still not far enough along to do a completely accurate evaluation, but the preliminary data suggests that the subsurface water in this area does not have the potential for production of electricity.

The Anaconda Mining Company has made a claim to mine zeolite on a 3,380-acre section of BLM administered land located three miles from the refuge boundary and six miles west of refuge headquarters. Zeolite is a locatable mineral ore. It is used as a filtering agent for pollutants, nitrates, and phosphates from sewage, water and air. When zeolite becomes saturated with phosphates and nitrates, it can be used as a soil additive.

We are not familiar with zeolite mining operations, but since the claim is located on a low range of hills overlooking the Lower Blitzen Valley and Malheur Lake marsh, such operations could have a fairly significant aesthetic impact on this part of the refuge.

Within the zeolite claim area is a BLM scientific study area set aside for the protection of the rare plant species Stephanomeria, or Malheur Wire Lettuce, which was recently designated by the Fish and Wildlife Service for inclusion on their national list of threatened and endangered plants.

There are several geologic features on the refuge that are worthy of special consideration. These include the extensive active sand dune formation on the north and northeast edges of Harney Lake, and the tiered gravel beach ridges along the south shore of the lake. The latter were used to a limited extent in the past by neighboring ranchers in the Double-0 area as an excellent source of road surfacing material. However, that use was terminated in 1972 in recognition of the ridges' value to geologists and archaeologists in interpreting the history of the Harney Basin. Both of these features are now almost entirely protected within the Harney Lake National Research Natural Area.

The volcanic domes within the Blitzen Valley, such as the Coyote Buttes, Rattlesnake Butte, and Saddle Butte along our west boundary, are of special interpretive interest, since, in Bruce Nolf's words, "they are like little volcanoes". These buttes, including the BLM administered Saddle Butte, also have considerable potential as the only suitable visitor overlook sites in that part of the refuge (Lower Blitzen Valley Unit).

Information contained in Mineral and Water Resources of Oregon, USGS Bulletin 64, 1969, and the Summary Report on the Geology and Mineral Resources of the Harney Lake and Malheur Lake Areas of the Malheur NWR, North-Central Harney County, Oregon, USGS Bulletin 1260-L, M, indicate there is very little potential for valuable deposits of either leasable or locatable minerals.

There is an excellent source of river gravel available in the Upper Blitzen Valley near the P-Ranch which has been used over the years by the refuge and state and county agencies for road surfacing purposes. In past years, gravel was mined from the Blitzen River channel just below Page Dam and from a gravel pit in the meadow just west of that site.

Use of the river as a source of gravel was suspended by the refuge in 1972 because of its potential impacts on aquatic life associated with the river and on water quality. Use of the pit site was phased out in 1973 because of concern about the long-

term effects of continual mining on the aesthetics of the area, and the availability of suitable alternative road surfacing material in the State Highway Department's pit on P-Hill, west of the refuge.

d. Research Natural Areas - There are two formally designated Research Natural Areas (RNA) on the refuge, the Harney Lake and Stinking Lake Research Natural Areas. Each RNA constitutes a site where natural features are preserved for scientific purposes and natural processes are allowed to dominate. The main purposes are to provide:

- 1) Baseline areas against which effects of human activities can be measured; and
- 2) Sites for study of natural processes in undisturbed ecosystems;
- 3) Gene pool preserves for all types of organisms, especially rare and endangered species.

The total Federal system is outlined in A Directory of the Research Natural Areas on Federal Lands of the United States of America, a copy of which is on file in the refuge library. In Oregon and Washington, of the 64 Federal Research Natural Areas that have been established, 45 are described in Federal Research Natural Areas in Oregon and Washington: A Guidebook for Scientists and Educators, along with details on management and use of such tracts. Eight have been described in supplements to the guidebook. The Harney Lake Research Natural Area is described in detail in Supplement No. 9, which was published in 1979, and is on file at the refuge. The Stinking Lake RNA is described in Supplement No. 11, which was published in 1982 and is also on file at the refuge.

The Harney Lake RNA was established on March 4, 1975 to exemplify southeast Oregon alkaline lakes (playas) and associated vegetation and wildlife. It contains 30,000 acres, embracing the entire Harney Lake bed (Figure 10).

The Stinking Lake RNA was also established on March 4, 1975 to preserve an example of a small, spring-fed lake in Southeast Oregon and the associated high desert flora and fauna. It contains approximately 1,555 acres and is located in the Double-0 Unit of the refuge (Figure 11).

The guiding principle in management of Research Natural Areas is to prevent unnatural encroachments, activities which directly or indirectly modify ecological processes on the tracts. No use is allowed which threatens significant impairment of scientific or educational values. Management practices necessary for maintenance of the ecosystem may be allowed.

Research Natural Area management plans have not yet been prepared for these two areas. They will be scheduled as soon as funds and manpower permit.

- e. Wilderness Review - The Wilderness Act of September 4, 1964, (Public Law 88-577) created a National Wilderness Preservation System which was defined as a system of federally owned area designated by Congress as "wilderness areas" and administered for the use and enjoyment of the American people "in such manner as will leave them unimpaired for future use and enjoyment as wilderness."

The review requirements of the Act applied to all federal lands within the National Forest, National Park, and National Wildlife Refuge System.

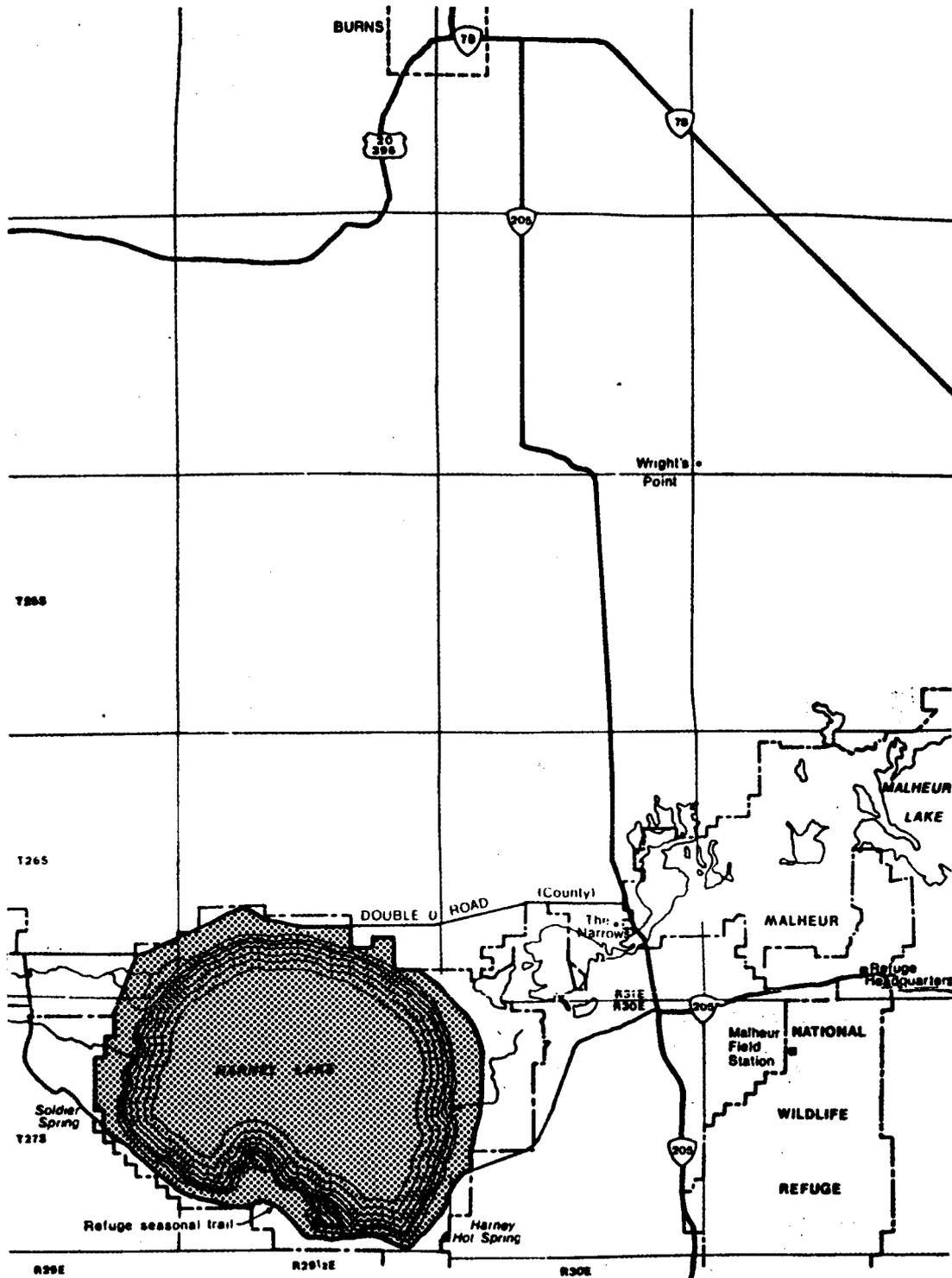
The Secretary of the Interior was directed to review lands within the National Wildlife Refuge System within ten years after the effective date of the Act, and report to the President of the United States his recommendations as to their suitability or unsuitability for preservation as wilderness.

Sections 4(a) and (b) of the Wilderness Act provide that: (1) the Act is to be within and supplemental to the purposes for which National Wildlife Refuges are established and administered; (2) wilderness areas shall be administered for such other purposes for which they may have been established, so as to preserve their wilderness character and shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use insofar as primary refuge objectives permit. Wilderness designation does not remove or alter an area's status as a National Wildlife Refuge.

The initial review of areas within the Refuge System revealed there were about 90 National Wildlife Refuges, containing nearly 25 million acres, which qualified for study as wilderness.

Their selection was based on the criteria established in the Act; that is, roadless areas of 5,000 continuous acres or more, and roadless islands, regardless of size, which:

- (a) are reasonably compact;
- (b) are undeveloped;
- (c) possess the general characteristics of a wilderness; and
- (d) have no improved roads suitable for public travel by conventional automobiles.



**Legend**

-  Harney Lake RNA
-  Refuge Boundary

**Location of Harney Lake**

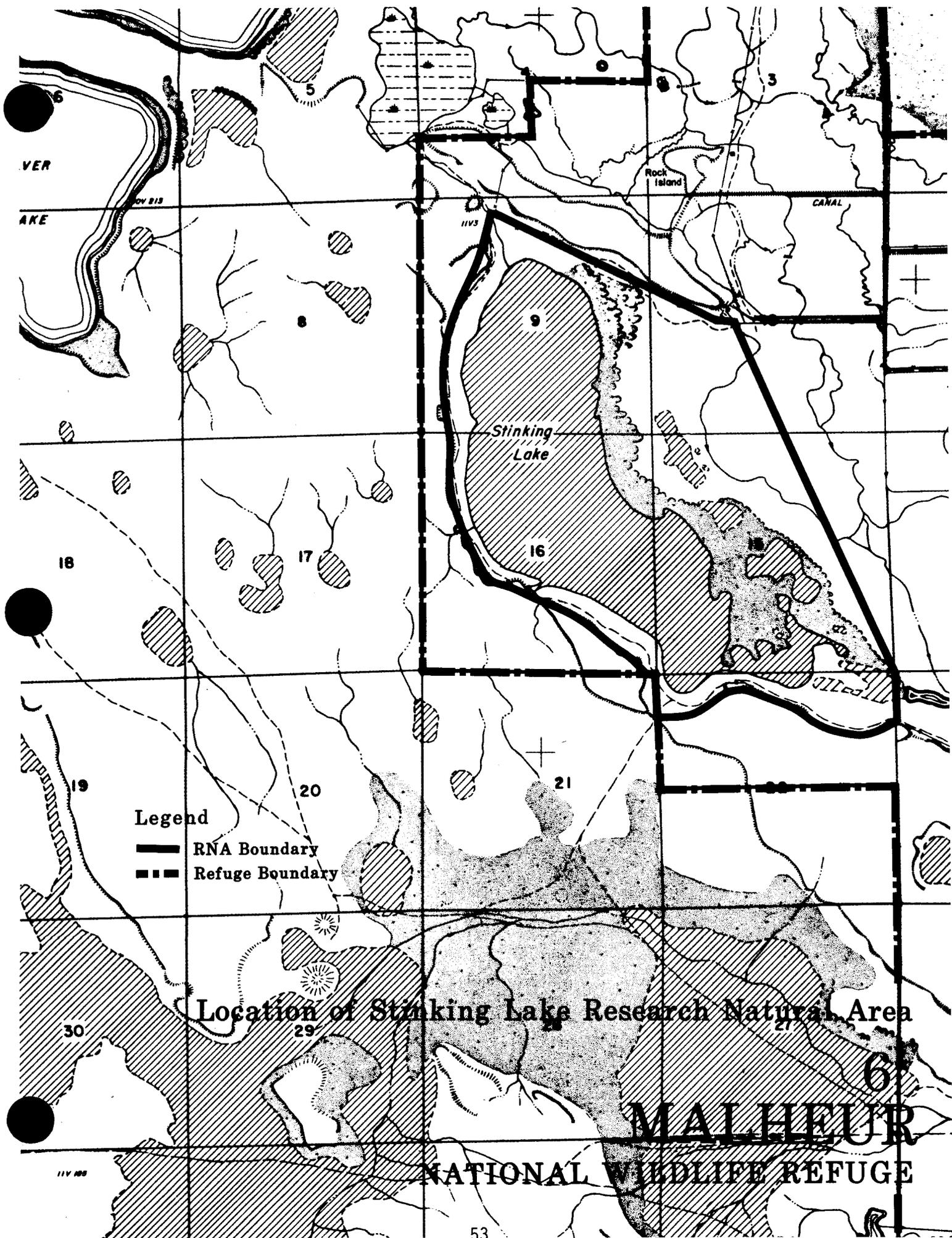
**5**

**MALHEUR  
NATIONAL WILDLIFE REFUGE**

The Act stipulated that review of one-third of the qualifying areas be completed within three years after the effective date of the Act; two-thirds within seven years; and the balance within ten years or by September 3, 1974. Studies were completed on 30 refuges during the first three-year period. Included in this group was the Malheur NWR.

Two areas within the Malheur NWR were identified as meeting the criteria for review for wilderness: Malheur Lake marsh and Harney Lake. The total area reviewed was 78,000 acres, or about 43 percent of the total 180,851 acres that were in the refuge at that time. A report describing the study area was published in March 1967.

The original wilderness recommendations contained two wilderness units; Malheur Lake, with about 48,000 acres, and Harney Lake with 30,000 acres. These recommendations were presented at a public hearing on May 2, 1967, in Burns, Oregon. There was strong local opposition expressed at the hearing, rising out of fears of possible harm to Harney County's economic well being. Most arguments presented appeared to be the result of general misunderstanding of what wilderness designation would entail, including the possible elimination of grazing and the possibility of interference with potential water developments in watersheds upstream from the proposed units. Objections were also expressed about including Malheur lake bed lands that have historically been used by local ranchers for the harvest of native hay.



**Legend**

- RNA Boundary
- - -** Refuge Boundary

Location of Stinking Lake Research Natural Area

**MALHEUR**  
**NATIONAL WILDLIFE REFUGE**

As a result of the hearing, the Malheur Lake unit boundary was adjusted to contain only the central portion of the marsh, or about 20,600 acres, which excluded the hayed areas. The Harney Lake unit remained unchanged.

This revised wilderness proposal was introduced in the form of a Wilderness Omnibus Bill (S. 3014) in October, 1969. The Senate Committee on Interior and Insular Affairs held hearings on it on November 6 of that year. Because of Senator Mark Hatfield's dissatisfaction with the proposal, it was deleted from the bill and sent back for further study.

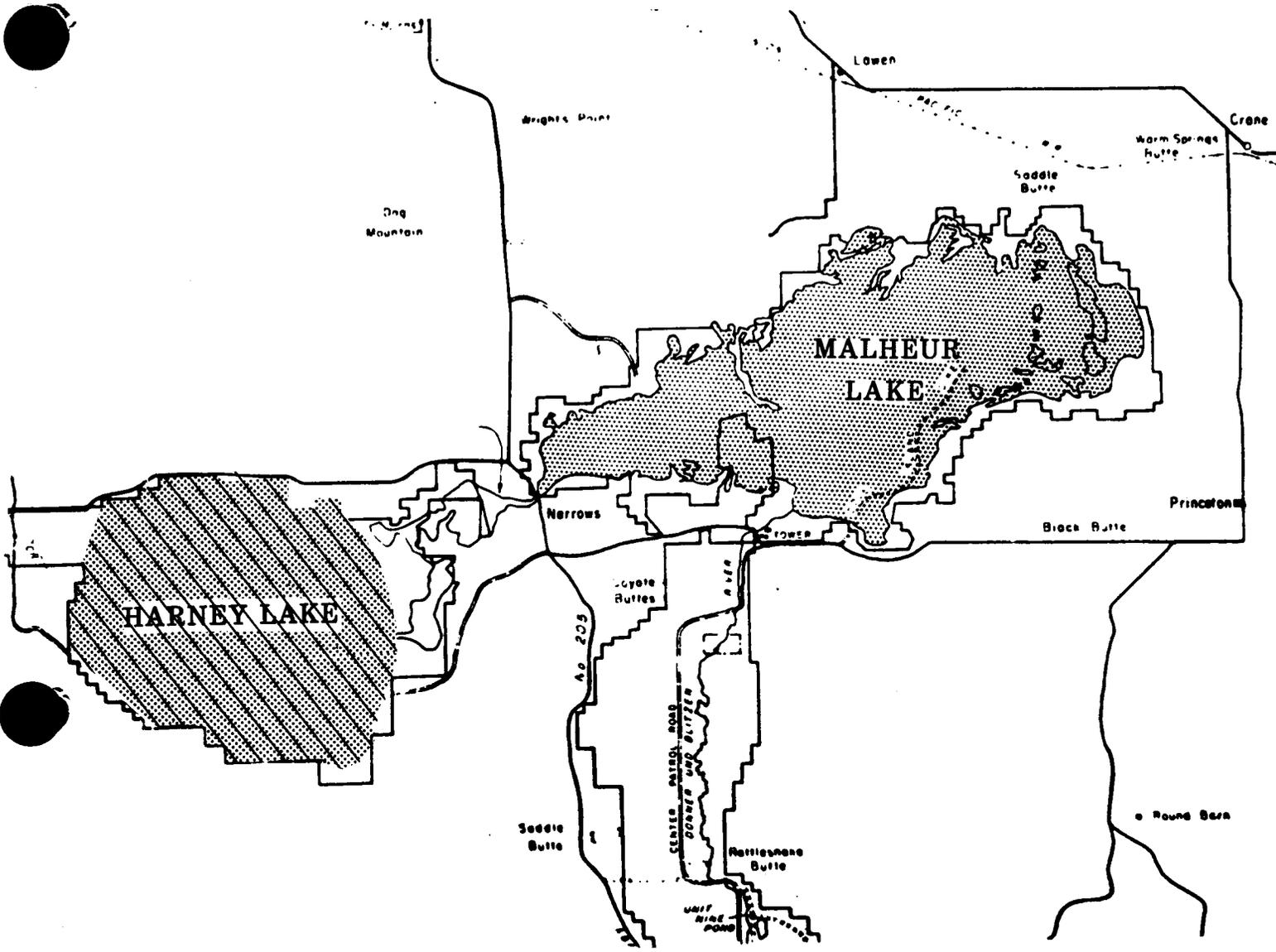
In 1973, the Fish and Wildlife Service completed a review of the Malheur proposal, and recommended it be revised to include only the 30,000-acre Harney Lake area. It was felt Malheur Lake marsh should not be recommended for designation as wilderness because of the uncertainty surrounding future water and development needs within the Malheur-Harney Lakes Basin, and its impact on the management of Malheur Lake. It was further stated in that review that Malheur Lake's wilderness characteristics would be maintained until such time as those needs could be determined. Those recommendations were formally adopted by the Secretary of the Interior on May 16, 1973.

A Draft Environmental Statement on the revised proposal was prepared later that year and is on file.

The decision to not recommend any wilderness designation for Malheur Lake was further influenced by the Fish and Wildlife Service's continuing inability to effectively manage an introduced population of carp and its adverse impacts on the marsh's productivity. Because of that, it was felt future development or artificial manipulation of the marsh should remain a management option.

A technical advisory committee was organized in February 1980, for the purpose of developing recommendations concerning the future management of Malheur Lake marsh. One of the issues the committee was asked to comment on was the direction that marsh management should take relative to natural vs manipulative management. The committee was unanimous in their opposition to artificial regulation of water levels, and recommended emphasis be placed on natural ecological processes. In the words of one committee member, Malheur marsh "...cannot be modified in any way without the possibility of major unpredictable changes; its natural and scientific values encourage preservation in an unmanaged state."

While that statement seems to favor wilderness designation, the Committee did not reach a consensus on the issue of wilderness designation. Many members perceived wilderness classification as a restriction to environmental manipulation, regardless of its naturalness. It was felt the use of such



**Legend**

-  Wilderness Study Area
-  Wilderness Proposal

**Wilderness Study Areas and Wilderness Proposal (1)**

**7**

**MALHEUR  
NATIONAL WILDLIFE REFUGE**

(1) As of 5-14-81

designation might and probably would preclude such desirable management actions as carp control, prescribed burning, the use of machinery management, etc., "...even if such management practices are ecological equivalents and necessary substitutes of former ecological phenomena."

The Committee's final report, Future Management of Malheur Lake Marsh: Recommendations of the Technical Advisory Committee, July 1980, is on file in the refuge library.

The Malheur Wilderness Proposal remains unchanged since 1973 and still awaits congressional action. It involves approximately 30,000 acres encompassing Harney Lake, or about 16 percent of the total 184,124 acres now within the refuge. It is bounded on the north, west, and south by roads and refuge boundary lines, and on the east by a prominent line of sand dunes.

6. Adjacent Land Use

In order to identify any potential conflicts which might develop between adjacent land use and proposed refuge programs and development, certain resource information was mapped on acetate overlays for the area of ecological concern discussed in Section I - C. The following information was mapped and is on permanent file at the refuge:

<u>RESOURCE INFORMATION</u>	<u>SOURCE</u>
1. Land Use (records cropland, forest land, and range and pasture land)	Harney County comprehensive Land Use Plan
2. Recreation development and special points of interest	All other Federal and State land management agencies and the Soil Conservation Service
3. Soils and mineral deposit sites	Resource Atlas for Harney County, Oregon. September 1973. Extension Development Project, Oregon State University, and Oregon's Long-Range Requirements for Water, 1967. Published by the Oregon State Water Resources Board
4. Important wildlife habitat areas (records game fish distribution, big game ranges, and upland game bird areas).	Oregon Department of Fish and Wildlife

C. Resource Capability Assessment

1. Suitability Mapping

The resource data and locational criteria were used to determine the refuge's capability or suitability to produce the various outputs. This information was delineated on Suitability Maps, which are filed in the refuge office. These maps show where resources occur in the necessary combinations or relationships to support major outputs. In addition to portraying suitable locations for an output, or combination of outputs, the Suitability Map indicates the production capability of a particular location. Each production area on the Suitability Map was analyzed and assigned a rating of Optimum, Acceptable, or Minimum, based on the locational criteria. For wildlife outputs, the total area available for production purposes was computed, measuring the present suitability of the refuge for a particular use, assuming optimum management and no additional development.

We recognized when we made those assumptions that (1) optimum management conditions currently do not exist in all cases, and (2) that additional physical development might, conceivably, be needed to meet certain objective levels. Examples of the former include our present inability to effectively manage carp in Malheur Lake marsh, and the fact that our vegetation management program is still undergoing change as we refine our application of management techniques such as grazing, haying, and prescribed burning, to make them as supportive of our wildlife habitat management objectives as possible.

Our reason for the optimum management assumption related primarily to the fact that we feel optimum or the most effective level of management, with the possible exception of the carp problem, is an attainable long-range goal on this refuge. Thus, for long-term planning purposes, we feel our assumption is a logical one. The suitability documentation materials on file at the refuge do include discussions of management problems and needs as they relate to the suitability ratings (and as we currently understand them), for each unit.

Habitat development opportunities (potential suitability) were identified and mapped at the same time. However, as indicated above, they were not considered in determining present suitability for wildlife outputs.

The primary reason we decided to use this approach relates to the fact that the refuge areas most suitable for physical development (Double-0 and Blitzen Valley Units), have already been rather extensively developed. In spite of this, many recorded historic wildlife output levels were higher during periods when there was much less development than what now exists. That fact, coupled with our experience with improved habitat management practices during the past 12 years, suggests strongly that the reasons for recorded wildlife use declines are not related to development needs, but rather to habitat and wildlife population management considerations

and (probably to some extent) external influences such as the extent and quality of wintering habitat, predation, hunting mortality, food availability at migration stops, etc. For this reason, additional development and the outputs associated with it, will only be considered (and quantified) if an output demand deficit is later determined to exist and development is considered essential to meeting that deficit after all management alternatives are fully explored.

This, of course, does not rule out the possible need for rehabilitation or modification of existing developments to improve their effectiveness or regain full operational capabilities, and such needs will continue to be addressed as they are identified. In fact, the unprecedented flood stage flows experienced from 1980-84 have caused significant damage to water management facilities in the Blitzen and Double-0 Units. Extensive rehabilitation will be required before optimum management objectives can be reached.

For public use outputs, suitable locations were portrayed and ratings of Optimum and Acceptable only were assigned. Because of the public use locational opportunities available on Malheur, it was decided that it was neither necessary nor desirable to consider any location that did not meet at least an Acceptable rating.

Backup documentation for the suitability mapping is on file at the refuge (see Master Planning). It is arranged by planning unit and by major outputs for which suitability was mapped. Documentation of locational criteria is contained in the Technical Appendices to the Master Plan. Summaries of the habitat acreages for each of the major wildlife outputs mapped follow in Tables 14 through 19.

Table 14. Habitat acreage by category, for major wildlife outputs  
 Planning Unit 1, Double 0. <sup>(1)</sup>

<u>Production:</u>	<u>OUTPUT</u>	<u>OPTIMUM</u>	<u>ACCEPTABLE</u>	<u>MINIMUM</u>
Greater Sandhill Crane		1,285	966	859
Trumpeter Swan		298	0	485
Canada Geese		1,755	103	244
Dabbler Ducks		3,174	3,434	4,146
Diver Ducks		1,506	173	293
Marsh and Waterbirds		1,158	93	173
Shorebirds		3,192	3,416	1,877
Long-billed Curlew (and Maint.)		5,997	4,347	5,933
Snowy Plover		(unknown at time of inventory)		
Raptors				
Upland Shrub Nesters		8,211	0	1,727
Meadow Nesters		3,318	1,269	216
Tree Nesters		43	0	0
Rimrock Nesters		0	0	0
Bobolink (and Maint.)		0	0	0
<u>Maintenance:</u>				
Greater Sandhill Crane		715	43	139
Swan and Diver Ducks		1,515	0	616
Goose and Dabbler Ducks		3,954	445	4,261
Shorebirds, Marsh and Waterbirds		3,830	0	4,192
Long-billed Curlew		(see above)		
Snowy Plover		700	0	0
Bobolink		0	0	0

(1) Total acreage in unit = 19,126

Table 15. Habitat acreage by category for major wildlife outputs  
 Planning Unit II, Harney Lake-Mud Lake.<sup>(1)</sup>

<u>OUTPUT</u>	<u>OPTIMUM</u>	<u>ACCEPTABLE</u>	<u>MINIMUM</u>
<u>Production:</u>			
Greater Sandhill Crane	0	153	1,372
Trumpeter Swan	0	0	1,574
Canada Geese	0	150	1,372
Dabbler Ducks	0	0	2,680
Diver Ducks	0	0	1,667
Marsh and Waterbirds	12	0	291
Shorebirds	8,596	0	689
Long-billed Curlew (and Maint.)	0	0	0
Snowy Plover	96	0	0
<u>Raptors</u>			
Upland Shrub Nesters	0	3,424	5,793
Meadow Nesters	0	0	297
Tree Nesters	0	0	0
Rimrock Nesters	0	0	3,627
Bobolink (and Maint.)	0	0	0
<u>Maintenance:</u>			
Greater Sandhill Crane	0	0	0
Swan and Diver Ducks	0	0	0
Goose and Dabbler Ducks	355	0	1,416
Shorebird, Marsh, and Waterbird	9,627	0	35
Long-billed Curlew	0	0	0
Snowy Plover	243	0	0
Bobolink	0	0	0

(1) Total acres in unit = 43,208

Table 16. Habitat acreage by category for major wildlife outputs  
 Planning Unit III, Malheur Lake. <sup>(1)</sup>

<u>OUTPUT</u>	<u>OPTIMUM</u>	<u>ACCEPTABLE</u>	<u>MINIMUM</u>
<u>Production:</u>			
Greater Sandhill Crane	4,984	0	0
Trumpeter Swan	17,012	966	1,172
Canada Geese	27,756	7,017	10,520
Dabbler Ducks	7,657	1,606	2,120
Diver Ducks	27,988	4,310	6,560
Marsh and Waterbirds	47,401	2,985	4,824
Shorebirds	10,214	6,499	14,233
Long-billed Curlew (and Maint.)	11,241	672	5,868
Snowy Plover	(unknown at time of inventory)		
<u>Raptors</u>			
Upland Shrub Nesters	(not inventoried)		
Meadow Nesters	0	0	0
Tree Nesters	0	0	0
Rimrock Nesters	0	0	0
Bobolink (and Maint.)	0	0	0
<u>Maintenance:</u>			
Greater Sandhill Crane	4,739	0	0
Swan and Diver Ducks	38,179	0	4,360
Goose and Dabbler Ducks	38,179	0	4,360
Shorebird, Marsh and Waterbird	36,045	12,092	10,628
Long-billed Curlew	(unknown at time of inventory)		
Snowy Plover	0	1,000	0
Bobolink	0	0	0

(1) Total acreage in unit = 57,195

Table 17. Habitat acreage by category for major wildlife outputs  
 Planning Unit IV, Lower Blitzen Valley. (1)

<u>OUTPUT</u>	<u>OPTIMUM</u>	<u>ACCEPTABLE</u>	<u>MINIMUM</u>
<u>Production:</u>			
Greater Sandhill Crane	5,606	1,795	6,460
Trumpeter Swan	1,164	262	1,364
Canada Geese	1,275	939	1,590
Dabbler Ducks	7,428	6,048	2,873
Diver Ducks	1,184	2,446	2,024
Marsh and Waterbirds	1,864	257	828
Shorebirds	6,193	2,099	2,308
Long-billed Curlew (and Maint.)	(unknown at time of inventory)		
Snowy Plover	0	0	0
<u>Raptors</u>			
Upland Shrub Nesters	12,926	0	2,268
Meadow Nesters	17,299	430	1,473
Tree Nesters	0	438	0
Rimrock Nesters	249	233	729
Bobolink (and Maint.)	(unknown at time of inventory)		
<u>Maintenance:</u>			
Greater Sandhill Crane	2,611	108	352
Swan and Diver Ducks*	1,398	67	1,681
Goose and Dabbler Ducks	3,995	2,094	2,860
Shorebird, Marsh and Waterbird	8,057	2,356	3,136
Long-billed Curlew	(unknown at time of inventory)		
Snowy Plover	0	0	0
Bobolink	(see above)		

(1) Total acreage in unit = 39,082

\*Swan only

Table 18. Habitat acreage by category for major wildlife outputs  
 Planning Unit V, Upper Blitzen Valley. (1)

<u>OUTPUTS</u>	<u>OPTIMUM</u>	<u>ACCEPTABLE</u>	<u>MINIMUM</u>
<u>Production:</u>			
Greater Sandhill Crane	7,600	2,834	2,059
Trumpeter Swan	1,326	344	685
Canada Geese	1,749	675	262
Dabbler Ducks	5,888	5,654	3,394
Diver Ducks	2,180	90	705
Marsh and Waterbirds	3,702	389	342
Shorebirds	5,184	349	107
Long-billed Curlew (and Maint.)	1,851	0	83
Snowy Plover	0	0	0
<u>Raptors</u>			
Upland Shrub Nesters	3,470	0	693
Meadow Nesters	10,370	0	0
Tree Nesters	30	488	0
Rimrock Nesters	600	80	120
Bobolink (and Maint.)	1,683	1,850	1,900
<u>Maintenance:</u>			
Greater Sandhill Crane	1,904	323	58
Swan and Diver Ducks*	3,061	1,168	7,052
Goose and Dabbler Ducks 3,306	3,306	1,136	3,051
Shorebird, Marsh and Waterbird	10,737	738	532
Long-billed Curlew	(see above)		
Snowy Plover	0	0	0
Bobolink	(see above)		

(1) Total acreage in unit = 26,877  
 \*Swan only

Table 19. Habitat acreage by category for major wildlife outputs  
Planning Units I through V, Malheur NWR.

<u>OUTPUT</u>	<u>OPTIMUM</u>	<u>ACCEPTABLE</u>	<u>MINIMUM</u>
<u>Production:</u>			
Greater Sandhill Crane	19,475	5,748	10,750
Trumpeter Swan	19,800	1,562	5,280
Canada Geese	32,535	8,884	13,988
Dabble Ducks	24,147	16,742	15,213
Diver Ducks	32,858	7,019	11,249
Marsh and Water Birds	54,137	3,724	6,458
Shorebirds	33,379	12,363	19,214
Long-billed Curlew (and Maint.)	19,089	5,019	11,884
Snowy Plover	96	0	0
<u>Raptors</u>			
Upland Shrub Nesters	24,607	3,424	10,481
Meadow Nesters	30,987	1,699	1,986
Tree Nesters	73	923	0
Rimrock Nesters	849	313	4,476
Bobolink (and Maint.)	1,683	1,850	1,900
<u>Maintenance:</u>			
Greater Sandhill Crane	9,969	474	549
Swan and Diver Ducks	44,153	1,235	13,709
Goose and Dabbler Ducks	49,789	3,675	15,948
Shorebird, Marsh and Waterbird	68,296	15,186	18,523
Long-billed Curlew	(see production)		
Snowy Plover	943	1,000	0
Bobolink	(see production)		

2. Quantification of Present Suitability (Base Capacity)

The next step was to convert acres of wildlife habitat into quantities of potential outputs, i.e., number of young fledged (production), use days (maintenance), etc. These figures were derived through the use of production history data from the area, plus "carrying capacity" information from other regions. The resulting figures represent our best estimate of the output production potential within each habitat category; again, assuming optimum management and no additional development.

Public use output suitability was then quantified, and is summarized in Section b.

a. Wildlife Output Suitability

Tables 20 and 21 summarize the results of the wildlife suitability determinations by species and unit, respectively. A full documentation of the development of output levels for each species is on file at refuge headquarters.

Table 20. Present total refuge wildlife output suitability, by species.

<u>SPECIES</u>	<u>PRODUCTION*</u> <u>(YOUNG FLEDGED)</u>	<u>MAINTENANCE</u> <u>(USE DAYS)</u>
Greater Sandhill Cranes	150	1,027,090
Trumpeter Swan	199	---
Diving Ducks	39,179	---
Dabbling Ducks	109,064	---
Canada Geese	7,940	---
Marsh and Waterbirds	11,328	---
Shorebirds	unknown	---
Swan and Diving Ducks	---	9,439,550
Geese and Dabbling Ducks	---	27,408,050
Shorebirds, Marsh, and Waterbirds	---	7,774,130
Raptors	2,458	576,500

\*The above figures are estimated to be the maximum possible for this station. Species and/or groups of species are lumped where habitat is similar.

RESOURCE INVENTORY AND ANALYSIS

Table 21. Present wildlife output suitability by planning units.

OUTPUTS			UNITS					
<u>Production (young fledged)</u>	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>TOTAL</u>		
Greater Sandhill Crane	18	2	14	50	66	150		
Trumpeter Swan	3	1	173	10	12	199		
Diver Ducks	1,665	417	31,783	2,913	2,401	39,179		
Dabbler Ducks	18,949	2,680	24,474	33,539	29,422	109,064		
Canada Geese	368	68	6,672	408	424	7,940		
Marsh and Waterbirds	245	8	9,874	415	786	11,328		
Shorebirds (unknown)								
Raptors	235	59	---	1,219	945	2,458		
 <u>Maintenance (use-days)</u>								
Greater Sandhill Crane	75,040	---	473,900	270,020	208,130	1,027,090		
Swan and Diver Ducks	2,514,350	319,100	19,525,500	2,807,000	2,242,100	27,408,050		
Shore, Marsh & Water Birds	424,920	963,050	4,315,380	954,860	1,115,920	7,774,130		
Raptors (All)						576,500		

# 4

## REFUGE OBJECTIVES

#### IV. REFUGE OBJECTIVES

##### A. Listing of Refuge Outputs

The first task in developing objectives for the Malheur NWR was to prepare a preliminary list of the "things" produced or provided on the Refuge. The list included all of the "things" that are currently produced or provided, as well as those that have the potential to be produced or provided. An example of a current resource output of the Malheur NWR is the production of trumpeter swans. This output is measured in terms of the number of young swans produced per year. An example of a public use output would be the opportunity to conduct research. This output would be measured in terms of the number of studies conducted.

The Master Planning Team began the process of developing outputs for this refuge by referring to a Master Output List. This list addressed a wide range of outputs arranged in national priority order for the National Wildlife Refuge System. This list also provided in formulating a list directly applicable to the Malheur NWR. Guidance in developing priorities was also found in pertinent legal mandates, regional policy and other planning considerations.

The term "facility" refers to other functions and uses, such as service roads and maintenance compounds, that are required to support output activities or general refuge management operations. Definitions of all outputs are contained in Wildlife Refuge Handbook 4, Part III, pages 12-75, on file in the refuge office.

In updating the list of outputs and facilities that should be considered or are needed at Malheur, the Master Output List developed for the Refuge System was consulted, and a revised list, along with an analysis of its applicability to Malheur, prepared.

A summary of that list was sent out for public review with an information package in May 1980. The public was also asked at that time to express any special concerns or issues they felt should be considered as we progressed with the process of updating the Refuge Master Plan. Both the information packet and the comments received are appended in this plan.

The draft Master Plan presented an output list that reflected programmatic direction existing at the time that the draft was written. As some time had elapsed between the time that the draft was distributed for review and the final plan was prepared, the list was once again reviewed and modified to reflect current program direction. This final output list was then presented to the Associate Regional Director-Wildlife Resources and Regional Program Coordinators for their review on May 16, 1984. This final list was approved and is presented in Figure 8.

OUTPUTS IN PRIORITY	REQUIRES OBJECTIVES	REQUIRES LOCATIONAL CRITERIA
RESOURCE MANAGEMENT		
ENDANGERED SPECIES		
Peregrine Falcon Production & Maintenance	C X	X
Bald Eagle Maintenance	C X	X
Rare & Endangered Plants	P X	X
ENVIRONMENT		
Designated Sites	C X	X
MIGRATORY BIRDS		
Greater Sandhill Crane Production	C X	X
Greater Sandhill Crane Maintenance	C X	X
Trumpeter Swan Production	C X	X
Trumpeter Swan Maintenance	C X	X
Colonial Nesting Waterbird Production	C X	X
Riparian Species Production & Maintenance	C X	X
Diving Duck Production	C X	X
Tundra Swan Maintenance	C X	X
Diving Duck Maintenance	C X	X
Dabbling Duck Production	C X	X
White Pelican Production	C X	X
White Pelican Maintenance	C X	X
Canada Goose Production	C X	X
Dabbling Duck Maintenance	C X	X
Goose Maintenance	C X	X
Marsh & Waterbird Production & Maintenance	C X	X
Shorebird Production & Maintenance	C X	X
Raptor Production & Maintenance	C X	X
NON-MIGRATORY BIRDS		
Upland Game Birds Production & Maintenance	C X	
MAMMALS		
Furbearers Production & Maintenance	C	
Lg. Mammal Production & Maintenance	C X	
Predatory Mammal Production & Maintenance	C X	
WILDLIFE DIVERSITY		
Wildlife Diversity	C X	

C=Current output P=Potential output

Refuge Output List  
(revised 05/16/84)

8

**MALHEUR**  
**NATIONAL WILDLIFE REFUGE**

REFUGE OBJECTIVES

OUTPUTS IN PRIORITY	REQUIRES		
	REQUIRES OBJECTIVES	LOCATIONAL CRITERIA	
PUBLIC USE MANAGEMENT			
EDUCATION			
Outdoor Classrooms	C	X	X
INTERPRETATION			
Wildlife Trails, self-guiding (foot)	P	X	X
Wildlife Trails, self-guiding (vehicle)	C	X	X
RECREATION, NONCONSUMPTIVE			
Wildlife/Wildlands Observation (foot)	C	X	X
Wildlife/Wildlands Observation (vehicle)	C	X	X
Wildlife/Wildlands Observation (boat-river)	C	X	X
Wildlife/wildlands Observation (boat-marsh)	P	X	X
Photography	C	X	X
RECREATION, CONSUMPTIVE			
Hunting - General Waterfowl	C	X	X
Hunting - Upland Game	C	X	X
Hunting - Deer	C	X	X
Fishing - Warm Water (bass & crappie)	C	X	X
Fishing - Cold Water (trout)	C	X	X

C=Current output P=Potential output

Non-output activities and support facilities that are to be considered are listed in Figure 8.

Figure 9. Other Refuge Planning Considerations

ACTIVITIES

Camping  
Picnicking  
Field Trials  
Winter Sports  
    Ice Skating

FACILITIES

Buildings  
    Administration  
    Maintenance  
    Storage/Protection  
    Residences  
    Sanitation  
    Museum  
    Visitor Contact Station

Structures and Other Improvements

Roads, Paved and Other Improvements  
Parking Areas, Paved and Other  
Bridges, Vehicular  
Boardwalks/Bridges, Non-vehicular  
Trails, Paved and Other  
Dikes  
Canals/Ditches  
Water Control Structures  
Wells, Non-domestic  
Launch Ramps, Watercraft  
Fences  
Signs/Structures, Informational  
Towers, Observation  
Energy Distribution Systems, Domestic  
Water Systems, Domestic  
Sewer Systems, Domestic  
Transmission Lines, Corridors  
Leveled Croplands  
Islands, Ponds, Artificial

B. Summary of Output Levels Under Preferred Alternative

RESOURCE MANAGEMENT	Output Levels (long-range)
ENDANGERED SPECIES	
Peregrine Falcon P & M	9 nesting pairs
Bald Eagle M	6,500 use days
Rare & Endangered Plants	N/A
ENVIRONMENT	
Designated Sites	8
MIGRATORY BIRDS	
Greater Sandhill Crane P	150 birds
Greater Sandhill Crane M	250,000 use days
Trumpeter Swan P & M	30 produced/25,000 U/D
Swainson's Hawk P & M	5 nesting pairs
Ferruginous Hawk P & M	5 nesting pairs
Snowy Plover P & M	285 birds/67,000 U/D
White-faced Ibis P & M	1,600 birds/100,000 U/D
Snowy Egret P & M	450 birds/31,000 U/D
Black-crowned Night Heron P & M	1,700 birds/130,000 U/D
White Pelican P & M	540 birds/175,000 U/D
Bobolink P & M	? /500,000 U/D
Whistling Swan & Diver M	3,500,000 U/D
Goose P	3,000 birds
Goose M	1,666,000 U/D
Dabbler Duck P	50,000 birds
Dabbler Duck M	15,300,000 U/D
Diving Duck P	25,000 birds
Golden Eagle P & M	35 produced/3,600 U/D
Other Raptors P & M	§Maintain current
Other Shorebirds P & M	§ population and
Other Marsh & Waterbirds P & M	§ use levels.
NON-MIGRATORY BIRDS	
Upland Game Bird P & M	Maintain self-sustaining population
MAMMALS	
Large Mammal P & M	525 produced/140,000 U/D
Predatory Mammal P & M	Maintain self-sustaining population
WILDLIFE DIVERSITY	
Wildlife Diversity	Increase through re-introduction of endemic species.

P=Production M=Maintenance

## PUBLIC USE MANAGEMENT

EDUCATION	
Outdoor Classrooms	10,000 A. H.
INTERPRETATION	
Wildlife Trails, self-guiding (foot)	20,000 A. H.
Wildlife Trails, self-guiding (vehicle)	200,000 A. H.
RECREATION, NONCONSUMPTIVE	
Wildlife/Wildlands Observation (foot)	3,000 A. H.
Wildlife/Wildlands Observation (vehicle)	90,000 A. H.
Wildlife/Wildlands Observation (boat-marsh)	1,600 A. H.
Photography	15,000 A. H.
RECREATION, CONSUMPTIVE	
Hunting - General Waterfowl	8,000 A. H.
Hunting - Upland Game	2,000 A. H.
Fishing - Warm Water (bass)	5,000 A. H.
Fishing - Cold Water (stream)	3,000 A. H.

C. Summary of Output Levels under the No Funds Increase Alternative

	<u>1981 Output Levels</u>	<u>1995 Output Levels</u>
RESOURCE MANAGEMENT		
ENDANGERED SPECIES		
Peregrine Falcon P & M	unknown	no change
Bald Eagle M	1,175 UD	900 UD
Rare & Endangered Plants	unknown	no change
ENVIRONMENT		
Designated Sites	7 sites	7 sites
MIGRATORY BIRDS		
Greater Sandhill Crane P	32	15
Greater Sandhill Crane M	190,000 UD	142,000 UD
Trumpeter Swan P & M	15P/16,500 UD	8P/8,250 UD
Swainson's Hawk P & M	0P/unknown	no change
Snowy Plover P & M	170/48,000	100/40,000
White-faced Ibis P & M	1,400/99,000	no change
Snowy Egret P & M	250/22,000	300/25,000
Black-crowned Night Heron P & M	1,600/97,300	1,700/110,000
White Pelican P & M	124,000 UD	130,000 UD
Bobolink P & M	unknown	would decline
Whistling Swan & Diver M	4,670,000 UD	3,000,000 UD
Goose P	860	650
Goose M	1,666,388 UD	1,000,000 UD
Dabbler Duck P	32,000	20,000
Dabbler Duck M	10,370,000 UD	8,000,000 UD
Diving Duck P	19,800	5,000
Golden Eagle P & M	2 pair/N.A. UD	no change
Other Raptors P & M	unknown	no change
Other Shorebirds P & M	unknown	would decline
Other Marsh & Waterbirds P & M	1,240,000 UD	620,000 UD
NON-MIGRATORY BIRDS		
Upland Game Bird P & M	unknown	no change
MAMMALS		
Large Mammal P & M	575/140,000	500/130,000
Predatory Mammal P & M	unknown	no change
WILDLIFE DIVERSITY		
Wildlife Diversity	321 species	no change

P=Production M=Maintenance UD=Use days

## PUBLIC USE MANAGEMENT

EDUCATION		
Outdoor Classrooms	2,790 AH	no change
INTERPRETATION		
Wildlife Trails, (foot)	1,840 AH	900 AH
Wildlife Trails, (vehicle)	91,000 AH	45,000 AH
RECREATION, NON/CONSUMPTIVE		
Wildlife/Wildlands Obser. (foot)	1,670 AH	800 AH
W/W Obser. (vehicle)	46,500 AH	23,000 AH
W/W Obser. (boat-river)	60 AH	phase out
W/W Obser. (boat-marsh)	not developed	
Photography	572 AH	300 AH
RECREATION, CONSUMPTIVE		
Hunting - General Waterfowl	4,280 AH	0 AH
Hunting - Upland Game	900 AH	1,100 AH
Fishing - Warm Water (bass)	895 AH	1,000 A

D. Summary of Output Levels under Custodial Maintenance Alternative.

RESOURCE MANAGEMENT	Custodial Maintenance Level (10 years into Program)
<b>ENDANGERED SPECIES</b>	
Peregrine Falcon Production & Maintenance	None
Bald Eagle Maintenance	Small decline
Rare & Endangered Plants	Unknown
<b>ENVIRONMENT</b>	
Designated Sites	5
<b>MIGRATORY BIRDS</b>	
Greater Sandhill Crane Production	5
Greater Sandhill Crane Maintenance	75,000
Trumpeter Swan Production & Maintenance	Prod. 2-3,000
Swainson's Hawk Production & Maintenance	None
Ferruginous Hawk Production & Maintenance	None
Snowy Plover Production & Maintenance	"
White-faced Ibis Production & Maintenance	"
Snowy Egret Production & Maintenance	"
Black-crowned Night Heron Production & Maintenance	"
White Pelican Production & Maintenance	"
Bobolink Production & Maintenance	Severe decline
Whistling Swan & Diver Maintenance	Small decline
Goose Production	300
Goose Maintenance	500,000
Dabbler Duck Production	7,000
Dabbler Duck Maintenance	2,500,000
Diving Duck Production	Small decline
Golden Eagle Production & Maintenance	Similar
Other Raptors Production & Maintenance	"
Other Shorebirds Production & Maintenance	Large decline
Other Marsh & Waterbirds Production & Maintenance	"
<b>NON-MIGRATORY BIRDS</b>	
Upland Game Bird Production & Maintenance	Small decline
<b>MAMMALS</b>	
Large Mammal Production & Maintenance	Moderate increase
Predatory Mammal Production & Maintenance	Moderate increase
<b>WILDLIFE DIVERSITY</b>	
Wildlife Diversity	Small decline

OUTPUT LEVEL 10 YEARS INTO PROGRAM

## PUBLIC USE MANAGEMENT

## EDUCATION

Outdoor Classrooms 0

## INTERPRETATION

Wildlife Trails, self-guiding (foot) 0

Wildlife Trails, self-guiding (vehicle) 0

## RECREATION, NONCONSUMPTIVE

Wildlife/Wildlands Observation (foot) 0

Wildlife/Wildlands Observation (vehicle) 0

Wildlife/Wildlands Observation (boat-river) 0

Wildlife/Wildlands Observation (boat-marsh) 0

Photography 0

## RECREATION, CONSUMPTIVE

Hunting - General Waterfowl 0

Hunting - Upland Game 0

Hunting - Deer-Bow 0

Fishing - Warm Water (bass) 0

Fishing - Cold Water (stream) 0



# 5

ALTERNATIVES

## V. MASTER PLAN ALTERNATIVES

### A. General

The refuge objective-setting process involved developing three alternative objective output levels: the Preferred or Optimum Management Level; the no funds increase or Current Management Level; and the custodial maintenance or No Active Management Level.

Output priorities were developed from national program management documents, regional program briefs, and resource plans. Program objectives were translated into refuge objectives based on the innate ability of the refuge to support national and regional program goals. This final refuge output priority list reflects the planning team's judgement of the best balance and greatest potential for the production of outputs. The final priority order of outputs has changed somewhat from that displayed in the draft plan. This is a reflection of changes in program direction that have taken place since the draft plan was completed.

An output compatibility chart was used to facilitate the process of siting the outputs on the refuge in a manner which reduced potential conflicts. A chart was prepared for each of the five refuge planning units and conflicts in space and time were identified and resolved in favor of program priorities. The compatibility charts for each planning unit follow as Figures 13 through 17.

Additional documentation of the various conflicts identified and the discussions on how each was resolved is also on file. Since the nature of individual conflicts or potential conflicts vary with each planning unit, the specifics of how each conflict will be resolved will have to be developed further in operational plans.

B. REVIEW OF ALTERNATIVES

1. The Preferred or Optimum Alternative

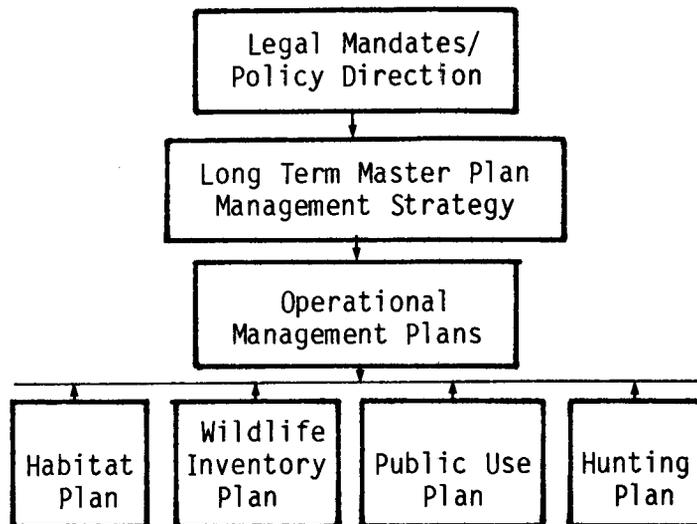
a. Objective Documentation Records

Records documenting the objective-setting process that led to establishment of optimum refuge objectives and objective output levels are contained in the Master Plan Technical Appendices.

b. Long Range Management Strategy

(1) Introduction

The purpose of the management strategy plan is to provide basic, long-term guidance for the management of refuge resources. The strategy plan provides the direction for the development of specific management plans. Schematically, this relationship can be depicted in the following manner:



At the primary level, legal mandates and policy direction (Section I-D-2) establish the philosophy and legal constraints which dictate, in a broad sense, how refuges generally, and Malheur specifically, are to be managed.

This strategy plan steps down legal mandates and policy direction and provides the broad, long-range strategy on how Malheur NWR will be managed to attain established objectives. The actual specifics of management are addressed in individual operational management plans which represent the lowest level of planning. The strategy plan is intended to provide long-range land management direction to Malheur NWR; yet, the plan

is intentionally broad in scope so as to remain flexible and responsive to new policy direction and new and unforeseen resource priorities which may develop in the future.

The plan established the management strategy for each planning unit by identifying specific management "themes". The theme is the focus around which all management activities are directed to produce outputs.

## (2) The Strategy Setting

Management on Malheur NWR will follow a holistic, ecosystem approach. Management decisions will not be made without giving consideration to the overall impacts on the integrity of the Malheur-Harney Lakes Basin ecosystem. Conversely, the ecosystem approach dictates that refuge responsibilities extend beyond the refuge boundary to insure that activities off the refuge (e.g. upstream storage reservoirs, power line right-of-ways, etc.) do not impact the integrity of the refuge. A continuing effort in this area will be made through coordination and open communication with private landowners and land management agencies in the Basin.

The necessity of the ecosystem approach is reinforced by the fact that the Malheur-Harney Lakes Basin, with its abundant wetlands and migratory bird resources, has been ranked nationally (number 58) by the Fish and Wildlife Service as an Important Resource Problem (IRP) area. Malheur NWR will continue to monitor wildlife populations and habitat changes throughout the Basin. However, additional funding and manpower is required for the refuge staff to adequately address the basin-wide responsibilities identified by the national IRP process.

All management will be directed towards preserving the natural resource base of the refuge: air, water, soil, and vegetation. Activities which have long-term detrimental impacts on this base will not be condoned.

Management will also be directed to maintain the aesthetic resources of the refuge. Management activities which have long-term negative impacts on visual resources, air quality, or the remote character of Malheur NWR will not be practiced. In addition, off-refuge activities that adversely impact refuge aesthetic resources will be discouraged.

Management will emphasize a diverse mixture of habitats to benefit groups of wildlife that utilize those habitats. With the exception of endangered, threatened, or sensitive species which may have a critical dependence on Malheur NWR land

management will not emphasize a single species to the exclusion or major detriment of another. For example, predator control aimed at improving Sandhill Crane recruitment would be considered only if critical to meeting flying and refuge objectives and the control effort would be as selective as possible.

Management will emphasize native or indigenous habitat diversity. Introduction of exotic plants and animals simply to increase habitat or wildlife diversity and abundance will not be practiced. In addition, artificial structures such as wood duck boxes, nesting platforms, and other man-made contrivances will be discouraged unless they fill a critical need for a key species.

No individual habitat will be managed to the complete exclusion of another. Thus, riparian zones will not be eliminated to facilitate irrigation nor will upland sagebrush-greasewood ecotones be inundated to create wetlands. Each habitat has its own values and it is the mixing and diversity of these habitats that will be emphasized.

As the Master Plan objectives and strategies are stepped down into unit, specific objectives, and management plan, the habitat management program (burning, grazing, deferment, etc.) will be refined. A Comprehensive Habitat Management Program (HMP) was initiated in 1985 to guide the process of moving from the Master Plan to specific Management Plans.

The HMP will utilize the new habitat management specialist position to: (1) resurvey habitat in the Blitzen and Double-O Valley to better define present habitat conditions; (2) develop specific habitat prescriptions for each field and unit that describes the optimum vegetation and water conditions needed to produce or maintain objective levels; (3) develop a plan of action (i.e. the specific treatments or tools to be used) that will allow the refuge to obtain or reach objective levels and (4) focus maintenance and rehabilitation efforts towards the areas that will protect or obtain the greatest benefit to high priority species.

Habitat management will emphasize, where practical, the use of natural ecological processes such as drought-flood cycles, prescribed fire, and grazing rather than intensive management through manipulative practices such as storage reservoirs, irrigation wells, and pesticides. Refuges in general and Malheur NWR particular should be the premiere showcase of wildlife management and good land stewardship on public land.

Management will encourage the reintroduction of native flora and fauna. This will include only those species that were

historically and commonly part of the Malheur-Harney Lakes Basin and will not include accidental occurrence or species on the very edge of their range.

Public use is allowable when compatible with the primary wildlife and habitat objectives of Malheur NWR. Non-consumptive uses will be given precedence over consumptive uses.

Finally, the long-term management strategy for Malheur NWR will include completion of land acquisition needs. Acquisition will follow the Land Protection Plan prepared in 1984. This plan is on file at refuge headquarters. The plan presents a series of alternatives for implementing action to acquire approximately 3,681 acres of privately owned land and 5,009 acres of public land adjacent to and/or within the refuge boundary. Exchange is the primary means proposed with approximately 3,684 acres of refuge lands identified as having exchange potential. If all of the actions were implemented, a net gain of 5,006 acres would be added to the current refuge acreage of approximately 184,124 acres.

### (3) Management "Theme" Selection

Management theme selection was based on legal mandates, policy direction, and information developed in the Resource Capability Assessments (Section II-D). Specific criteria used for theme selection included: land capability, past development, topography, geology, hydrology, existing habitat and wildlife uses, historic and prehistoric uses by man, designated sites, and public accessibility, among others.

Because of the biological and physiographic differences that exist between the five planning units, it was not possible to develop a uniform management theme or themes for the entire refuge. Thus, separate themes were developed for planning Units 1 through 3, and because of their similarity, Units 4 and 5 were combined.

Themes were developed for the four basic resource management categories within each planning unit: habitat, wildlife, public use, and land and water management. While there is obvious overlap between the first and last categories, it was felt that land and water management needed to be addressed separately from the issue of habitat types in terms of developmental vs non-developmental considerations. In all cases, themes were selected to provide a diverse and balanced mixture of outputs throughout the refuge.

The resulting management themes encompass the major resources of the refuge and how those resources will be managed, in a broad sense, for the benefit of wildlife and the public that visits the refuge.

The selection of habitat themes was influenced by the inherent features of each planning unit which make them unique. In some planning units these features were unusual or fragile habitats (e.g. hot springs in Harney Lake, alkali lakes in Double-0). In other areas, themes were developed around large expanses of habitat that dominate a given planning unit (e.g. alkali playa on Harney Lake, deep freshwater marsh on Malheur Lake). The habitat theme does not preclude protection or management of lesser habitats. Rather, the habitat theme identifies the most important, unique, or dominant habitat in each unit which will receive management emphasis.

Wildlife themes were selected based on past knowledge of traditional wildlife use patterns and wildlife-habitat interrelationships and chosen to be compatible with habitat themes. Wildlife themes focus on those animals which have the most critical habitat dependence in each unit. For example, Malheur Lake will be managed primarily to benefit colonial nesting marshbirds which are dependent upon hardstem bulrush and large marshes to support their rookeries. Incidental to this primary emphasis, several other wildlife outputs will benefit and be enhanced; e.g. waterfowl and shorebird maintenance. Thus, while each planning unit will receive specific wildlife output emphasis, this emphasis will not preclude the protection, management, and enhancement of other wildlife species which occur on the refuge.

Designated sites, accessibility, traditional use patterns, and past development provided the criteria for selection of public use themes. Public use themes were selected to be compatible with the habitat and wildlife themes for each planning unit and to provide a balanced mixture of opportunities for all refuge visitors. In some cases, such as designated Research Natural Areas, the public use theme precludes other public uses (e.g. wildlife observation-foot). In other areas, such as the Double-0, the primary theme (scientific research) will be emphasized. Other compatible uses such as wildlife observation will be allowed, but not encouraged.

Land and water management themes were selected primarily on the basis of past levels of physical development (e.g. dikes, ditches). Through the development and analysis of individual objectives documentation records, it was determined that refuge wildlife objective could be attained without any further physical development. However, a development theme of land and water management was chosen for those areas that have already

been developed (e.g. Double-0, Blitzen Valley) so that existing facilities could be maintained, rehabilitated, or modified, as needed. For planning units that have not undergone extensive physical development (e.g. Harney Lake, portions of Malheur Lake), a non-developmental theme was chosen as being most compatible with those areas' inherent natural wildlife values to wildlife. This prevents any unnecessary development and disruption to these areas. Within the context of this Master Plan, development includes only actual physical alterations such as roads, dikes, ditches, buildings, etc. Non-developmental management includes prescribed burning, grazing, haying, fencing, and signing.

Non-developmental management may be allowed in planning units with a developmental theme, but developmental management will not be allowed in planning units with a non-developmental theme.

(4) Refuge Management Strategy

(a) PLANNING UNIT I: DOUBLE-0

1. Habitat Management Strategy: Four primary habitats will receive management emphasis in the Double-0 planning unit.

The first is seasonal wet meadows, both alkaline (e.g. Stinking Lake Field) and fresh (e.g. Hughet Field). The alkaline wet meadow is typified by the saltgrass-greasewood community, and the fresh wet meadow is commonly vegetated with rushes, sedges, spikerushes, and grasses.

The second habitat to be emphasized is shallow semi-permanent alkaline and freshwater marshes. Alkaline marshes (e.g. South Stinking Lake Field) are typically vegetated with alkali bulrush, while freshwater marshes are dominated by hardstem bulrush, burreed and cattail (e.g. Martha Lake Field).

The third habitat to be emphasized is alkali playa lakes. These are typically seasonally flooded, shallow, and not vegetated (e.g. Stinking Lake).

The fourth habitat to be emphasized is managed ponds, both alkaline (e.g. Derrick Lake) and freshwater (e.g. Dune Pond). This habitat includes man-made ponds (e.g. Carp Pond) and naturally occurring lakes (e.g. Martha Lake) where water levels can be manipulated.



2. Wildlife Management Strategy: The primary wildlife theme in the Double-0 planning unit will be: 1) shorebird, dabbling duck, and greater sandhill crane production, and 2) shorebird maintenance.

Production will be emphasized in the meadows and adjacent uplands where it has been demonstrated that the Double-0 is one of the most important nesting areas on the refuge. Pond habitats will be managed to enhance production by providing breeding pair habitat and late season bird maintenance will be emphasized in the Stinking Lake Research Natural Area, a known late summer concentration area for thousands of migrant shorebirds. Pond habitats can be managed for fall shorebird maintenance through gradual drawdown if such activity is compatible with production objectives.

Waterfowl maintenance will not be emphasized in this planning unit because maintenance habitat is abundant on other parts of the refuge. Extensive maintenance habitat is also present on private lands, particularly in the spring on that portion of the Lower Warm Springs Valley located north of the Double-0 and the Silvies River Flood Plain.

3. Public Use Management Strategy: The primary public use theme in the Double-0 planning unit will be scientific research. A research natural area has already been dedicated at Stinking Lake.

The Double-0 Ranch headquarters has been nominated for listing on the National Register of Historic Places. This could develop into another emphasized public use, but it will be secondary to the scientific research theme.

Other non-consumptive uses may be allowed, but will not be encouraged or emphasized. Consumptive uses (hunting and fishing) will not be allowed, as they would result in significant conflicts with higher priority wildlife management objectives.

4. Land and Water Management Strategy: The land and water management theme in the Double-0 planning unit will be developmental. The area has already undergone extensive development in the form of roads, dikes, ditches, water control structures, ponds, nesting islands, farming, buildings, and signing.

Also, retention of the native wet meadow type is at least somewhat dependent upon the existing irrigation system. Under the developmental management theme, maintenance and rehabilitation of all existing structures and facilities will continue if compatible with the habitat, wildlife, and public use theme for the Double-0 area.

Non-developmental management will be emphasized over developmental management if it is more cost effective. If refuge outputs cannot be optimized with non-developmental management, new construction and development would focus on bringing refuge outputs up to objective levels as discussed in Section II, Resource Analysis. Only those outputs associated with the habitat, wildlife, and public use themes for this unit will be emphasized.

(b) PLANNING UNIT II: HARNEY AND MUD LAKES

1. Habitat Management Strategy: Habitats which will receive management emphasis in the Harney Lake unit are: 1) shallow alkaline playa lake, 2) alkali bulrush marsh (mouth of Silver Creek), 3) naturally flowing hot springs, and 4) peripheral sand dunes.

Habitat which will receive management emphasis in Mud Lake is shallow, semi-permanent freshwater marsh.

2. Wildlife Management Strategy: The wildlife theme for Harney Lake is spring and fall shorebird maintenance, and snowy plover production. Snowy plover production will be emphasized along the shore of Harney Lake and adjacent hot springs. It has been demonstrated in recent studies that these areas are some of the most important inland breeding areas for snowy plovers in Oregon. Management will focus on maintaining inflows of water to Harney Lake for production and maintenance habitat.

The wildlife theme for Mud Lake will be waterfowl production. Hardstem bulrush marshes and adjacent wet meadow areas will be managed primarily for Canada goose and duck (divers and dabblers) production.

3. Public Use Management Strategy: Harney and Mud lakes will be managed primarily for scientific research purposes. Harney Lake has been recommended as being suitable for wilderness designation. Until a final

determination is made, the lake will be managed as de facto wilderness. Harney Lake has also been designated a Research Natural Area dedicated to scientific study and educational use. Harney Lake is a fragile and sensitive habitat, particularly in the dune and hot springs areas. All public uses will be particularly scrutinized and monitored to insure that disturbances are minimized.

4. Land and Water Management Strategy: The theme on Harney Lake will be non-developmental. Construction of buildings, structures, roads, dikes, ditches, etc., will not be undertaken. Non-developmental management including natural drought-flood cycles, fire, fencing, and signing will be emphasized, although fencing and signing will be used only for protection of the area.

The primary importance of Harney Lake in the closed Basin ecosystem is hydrologic. Harney Lake is the sink for the entire Basin and serves as an evaporation pan where alkaline salts from the watershed are flushed and concentrated.

The natural, unaltered character of Harney Lake will be emphasized, particularly its role in the hydrology of a closed basin. This is consistent with the wilderness recommendation and Research Natural Area designations discussed above.

The land and water management theme on Mud Lake will be developmental; however, non-developmental if it is more cost effective. Existing dike and ditch systems may be utilized and maintained. The full wildlife management potential of Mud Lake can now be realized with the recent acquisition of the Dunn Tract. A comprehensive habitat management and development plan will be prepared prior to taking any developmental action.

Careful consideration is required due to the important role Mud Lake plays in the hydrology of the Basin by linking the entire Silvies and Blitzen River drainages (2,350 square miles) to Harney Lake.

(c) PLANNING UNIT III: MALHEUR LAKE

1. Habitat Management Strategy: The primary habitat theme for Malheur Lake will be deep, permanent to semi-permanent fresh water marsh. This habitat is typified by hardstem bulrush, burreed, and cattail



as the dominant emergent vegetation and sago pondweed as the dominant submergent. This habitat occurs as both large open water bays (Biological Units 5 and 6) and small isolated potholes (Biological Unit 4).

2. Wildlife Management Strategy: Three wildlife outputs will receive management emphasis on Malheur Lake. The first and most critical is colonial nesting bird production and maintenance. This includes black-crowned night herons, great blue herons, snowy egrets, great egrets, double-crested cormorants, white-faced ibises, Franklin's gulls, black terns, caspian terns, and eared grebes.

The second areas of management emphasis will be non-colonial over-water nesting production. Included in this group are diving ducks, particularly redheads, western and pied-billed grebes, Forster's terns, and coots.

The third area of management emphasis is fall waterfowl and shorebird maintenance habitat. In dry years, Malheur Lake is the only significant maintenance habitat in the entire Basin. When this habitat is in short supply, Malheur Lake's role is particularly critical. In addition, Malheur Lake has historically been a major fall concentration area for waterfowl, particularly canvasbacks, and shorebirds. Management will emphasize maintaining lake productivity to support these wildlife outputs.

3. Public Use Management Strategy: The primary public use theme in the Malheur Lake planing unit is wildlife interpretation and observation. These activities will be localized primarily at refuge headquarters where visitors can utilize the visitor contact station, wildlife museum, viewing deck, display pond, photo blind, and trails.

The second area of emphasis is environmental education. This activity will be localized primarily at refuge headquarters and at the George M. Benson Environmental Study Area northeast of refuge headquarters.

The third public use theme in the Malheur Lake Unit is scientific research.

The fourth public use to receive management emphasis is public waterfowl hunting. Malheur Lake is one of



the largest freshwater marshes in western North America and represents opportunity for the public to hunt in solitude surrounded by a natural, uncrowded setting. Hunting programs will emphasize a quality hunting experience rather than providing for maximum hunting opportunity.

4. Land and Water Management Strategy: The land and water management theme for Malheur Lake marsh is non-developmental. Construction of new dikes, ditches, roads, nesting islands, etc. into the marsh will not be permitted, except for roads considered necessary to provide minimum public hunting access to the periphery of the marsh. Maintenance of existing development in the headquarters will be allowed if compatible with other habitat, wildlife, and public use themes.

Management practices consistent with the nondevelopmental theme will be emphasized on the marsh, including fire, grazing, signing, fencing, and natural drought-flood cycles.

At the headquarters portion of this planning unit, the management theme will be developmental. This will include maintenance and rehabilitation of existing facilities and the construction of new facilities which are compatible with the habitat, wildlife, and public use themes for this unit.

- (d) PLANNING UNIT IV AND V: LOWER AND UPPER BLITZEN VALLEY (Planning Units IV and V have been combined due to their similarities.)

1. Habitat Management Strategy: Four primary habitats will receive management emphasis.

The first is seasonal wet meadows (e.g. Baker Field). This habitat is typified by low emergents (rushes, sedges, and spikerush) in the shallow flooded areas, and grasses and forbs in the drier sites. Wet meadows are often interspersed with dry uplands vegetated with Great Basin wild rye, greasewood, rabbitbrush, sagebrush, and other grasses. The wetter meadow sites are vegetated with tall emergents: bulrush, cattail, and burreed.

The second habitat to be emphasized is shallow freshwater marshes (e.g. Diamond Swamp) which are commonly vegetated with bulrush, cattail, and

# COMPATIBILITY CHART

Output / Facility	Hunting-Deer-Bow	Hunting-Upland Game	Hunting-Waterfowl	Photography	M/W Obs. (boat-marsh)	M/W Obs. (boat-river)	M/W Obs. (vehicle)	M. Trails s/g (vehicle)	M. Trails s/g (foot)	Outdoor Classrooms	Wildlife Diversity	Pred. Mammal P&M	Large Mammal P&M	Furbearers P&M	Upland Gamebird P&M	O. Marshwaterbirds P&M	Other Shorebirds P&M	Other Raptors P&M	G. Eagle P&M	Diver Duck P	Dabbler Duck M	Dabbler Duck P	C Goose M	C Goose P	W. Swan & Diver M	Bobolink P&M	Pelican P&M	BCNH P&M	Snowy Egret P&M	Ibis P&M	Snowy Plover P&M	Osprey M	Ferruginous P&M	Swainson P&M	GSH Crane M	GSH Crane P	T. Swan P&M	Designated Sites	Rare & End. Plants	Bald Eagle M	Peregrine P&M																			
Peregrine P&M	●	●			●	●	●	●	●										●							●																																		
Bald Eagle M		●																																																										
Rare & End. Plants	No Information																																																											
Designated Sites																																																												
T. Swan P&M			●	●			●	●	●	●	●	●	●	●																																														
GSH Crane P			●	●			●	●	●	●	●	●	●	●																																														
GSH Crane M	●	●	●	●			●	●	●	●	●	●	●	●																																														
Swainson P&M			●	●			●	●	●	●	●	●	●	●																																														
Ferruginous P&M			●	●			●	●	●	●	●	●	●	●																																														
Osprey M			●	●			●	●	●	●	●	●	●	●																																														
Snowy Plover P&M	No Potential in this unit																																																											
Ibis P&M			●	●			●	●	●	●	●	●	●	●																																														
Snowy Egret P&M			●	●			●	●	●	●	●	●	●	●																																														
BCNH P&M			●	●			●	●	●	●	●	●	●	●																																														
Pelican P&M			●	●			●	●	●	●	●	●	●	●																																														
Bobolink P&M			●	●			●	●	●	●	●	●	●	●																																														
W. Swan & Diver M			●	●			●	●	●	●	●	●	●	●																																														
C Goose P			●	●			●	●	●	●	●	●	●	●																																														
C Goose M	●	●	●	●			●	●	●	●	●	●	●	●																																														
Dabbler Duck P			●	●			●	●	●	●	●	●	●	●																																														
Dabbler Duck M	●	●	●	●			●	●	●	●	●	●	●	●																																														
Diver Duck P			●	●			●	●	●	●	●	●	●	●																																														
G. Eagle P&M			●	●			●	●	●	●	●	●	●	●																																														
Other Raptors P&M			●	●			●	●	●	●	●	●	●	●																																														
Other Shorebirds P&M			●	●			●	●	●	●	●	●	●	●																																														
Marshwaterbirds P&M			●	●			●	●	●	●	●	●	●	●																																														
Upland Gamebird P&M																																																												
Furbearers P&M																																																												
Large Mammal P&M																																																												
Pred. Mammal P&M																																																												
Wildlife Diversity																																																												
Outdoor Classrooms	●	●	●	●			●	●	●	●	●	●	●	●																																														
M. Trails s/g (foot)	●	●	●	●			●	●	●	●	●	●	●	●																																														
M. Trails s/m (vehicle)	●	●	●	●			●	●	●	●	●	●	●	●																																														
M/W Obs. (foot)	●	●	●	●			●	●	●	●	●	●	●	●																																														
M/W Obs. (vehicle)	●	●	●	●			●	●	●	●	●	●	●	●																																														
M/W Obs. (boat-river)	●	●	●	●			●	●	●	●	●	●	●	●																																														
M/W Obs. (boat-marsh)	●	●	●	●			●	●	●	●	●	●	●	●																																														
Photography	●	●	●	●			●	●	●	●	●	●	●	●																																														
Hunting-Waterfowl	●	●	●	●			●	●	●	●	●	●	●	●																																														
Hunting-Upland Game	●	●	●	●			●	●	●	●	●	●	●	●																																														
Hunting-Deer-Bow	●	●	●	●			●	●	●	●	●	●	●	●																																														

**KEY**  
 ● Major Conflicts  
 ○ Minor Conflicts  
 □ Compatible

DATE: October, 1981

PLANNING: #4 Lower

Blitzen Valley

13

**MALHEUR  
 NATIONAL WILDLIFE REFUGE**

burreed. In the Blitzen Valley these marshes are often associated with diked managed ponds.

The third habitat to be emphasized is riparian, typified by willows and brush thickets (e.g. Blitzen River, Island Field) and cottonwood trees (e.g. Benson Pond).

The fourth habitat to be emphasized is managed freshwater ponds (e.g. Knox Pond). In the Blitzen Valley, all of these ponds are man-made.

2. Wildlife Management Strategy: Wildlife themes which will receive management emphasis in the Blitzen Valley are: 1) greater sandhill crane, trumpeter swan, diving and dabbling duck production; 2) fall maintenance of greater sandhill cranes and waterfowl; 3) colonial marsh bird maintenance in the Lower Blitzen Valley; and 4) production and maintenance of riparian migratory birds.

Production will be emphasized in the meadows, marshes, and adjacent uplands where it has been demonstrated that the Blitzen Valley is one of the most important sandhill crane, trumpeter swan, and duck production areas on the refuge. Pond habitats will be managed to enhance production by providing breeding pair habitat and late season brood water.

Ponds and grainfields in the Blitzen Valley will be managed primarily for fall greater sandhill crane and waterfowl maintenance, particularly in the Buena Vista area. Blitzen Valley is the primary fall staging area for the Central Valley population of greater sandhill cranes.

Colonial marsh bird maintenance will be emphasized in the Lower Blitzen Valley Unit. Ponds, marshes, and meadows will be managed to emphasize feeding habitat for the hundreds of marsh birds which nest on Malheur Lake and feed in the Lower Blitzen Valley.

Production and maintenance of riparian wildlife, particularly migratory birds (e.g. willow flycatchers, yellow warblers, long-eared owls), will be emphasized. Riparian zones will be protected and re-established by planting of native species where practical.



3. Public Use Management Strategy: Three public use themes will be emphasized in the Blitzen Valley. The primary theme is wildlife interpretation and observation. The presence of the Center Patrol Road and the close proximity of several ponds make the Blitzen Valley the most accessible and most suitable portion of the refuge for wildlife observation and nature study by the general public. An established self-guiding auto tour route and a scenic overlook at Buena Vista Station further enhance these uses. Continuation of such uses will be emphasized.

The second public use to be emphasized is scientific research. The Blitzen Valley has proven to be an ideal field laboratory for research in wildlife and wetland ecology and these activities will be encouraged.

Environmental education will be emphasized in the Lower Blitzen Valley Unit. The Malheur Field Station and the adjacent Coyote Buttes Environmental Study Area will be the focal points for these activities in this portion of the refuge.

Finally, historic sites at Sodhouse Ranch and P-Ranch will be given public use emphasis. Both areas are listed in the National Register of Historic Places.

4. Land and Water Management Strategy: The land and water management theme in the Blitzen Valley is developmental. Maintenance, rehabilitation, and modification of existing facilities will continue in accordance with other themes discussed above.

Non-developmental management will be emphasized over developmental, particularly if it is a more cost effective means of reaching the output objective levels. Any new construction or development will focus on optimizing those outputs associated with the habitat, wildlife, and public use themes established for the Blitzen Valley.

c. Environmental Consequences of the Preferred Alternative

(1) Strategy Summary:

This alternative would entail full funding and management to achieve objective levels. It includes sufficient funding to bring facilities to fully operational Service standards. A summary of the management themes and strategies is outlined in Table 22.

- (a) Habitat Diversity: Habitat diversity would be optimized through water and vegetation management. Diversity of wetland habitats would be optimized

through irrigation of wet meadows and pond level management. In addition, ponds would periodically be rehabilitated by drawdowns to maintain submerged plant vigor and diversity.

Upland habitat diversity would be optimized through various treatment practices which could include grazing, haying, farming, prescribed burning, fencing, and deferment from haying or grazing.

- (b) Wildlife Diversity: Wildlife diversity would be optimized by emphasizing habitat diversities consistent with the long-term strategy themes. With the exception of endangered, threatened or key sensitive species, no single native wildlife species will be managed to the exclusion of another. Re-introduction of species which were once native to the Basin (e.g. river otter) will increase overall wildlife diversity above present levels.
- (c) Energy Efficiency: This alternative would require the greatest expenditure of energy (fuel, electricity, etc.). Although overall energy consumption would increase with more staff and more management activities, the efficiency with which that energy was used would increase through continued energy conservation practices such as use of more fuel efficient vehicles and insulation of buildings.
- (d) Ecological Quality: Overall ecological quality would be optimized. Management would emphasize activities which maintain, enhance, and improve the quality of air, water, soil, plant, and animal resources of the refuge.

Activities off-refuge would focus on monitoring and protecting the integrity of the Basin ecosystem through coordination, negotiation, and communication with public agencies and private landowners.

- (e) Visual Quality: Some minor, short-term visual impacts will occur under this alternative, such as smoke from prescribed burns, etc. However, every effort will be made to ensure that management activities minimize these impacts. Structures (signs, buildings, etc.) will be compatible with the quiet, remote, "western" character of Malheur NWR.

Many short-term conflicts with refuge visitors (e.g. smoke) can be minimized through scheduling (low use periods) or zoning (road closures).

- (f) Structural Stability: All existing or new buildings and facilities will be rehabilitated as needed and maintained at Service standards. Structural

stability will remain high and facilities will be fully operational and safe.

- (g) Public Use Quality: Public use quality will increase with this alternative. Existing public use facilities will be rehabilitated and improved as needed. In addition, this alternative will provide new and expanded public use opportunities on the refuge, e.g. visitor contact station and interpretive museum at headquarters, interpretation of refuge historic sites, and revised auto tour route.
- (h) Wildlife Populations Quality: Overall wildlife population quality, measured by abundance, diversity, and health will be optimized through management directed to provide a diverse, yet balanced mix of habitats. Exotic species such as chukar, pheasants, and introduced fish will not be emphasized and may experience overall declines. Long term management will emphasize reintroduction of once-native species such as river otter and Columbian sharp-tailed grouse.
- (i) Size and Shape of Refuge: This alternative would include completion of land acquisition (5,006 net acres) for the refuge. Acquisition will be on an exchange basis. This is not considered a significant change in refuge size. However, the refuge shape would change, though not drastically.
- (j) Access: No new access roads for either refuge staff or the public are anticipated under this alternative. However, new access opportunities for the refuge visitor would occur under this alternative from interpretive trails, and a realignment of an access road on the north shore of Malheur Lake.

Table 22. Summary of Management Strategy or Themes by Refuge Planning Unit, The Preferred Alternative.

Management Strategy or Theme	Unit I Double O	Unit II		Unit III Malheur Lake	Unit IV & V Blitzen Valley
		Harney Lake	Mud Lake		
HABITAT	-seasonal wet meadows (alkaline & fresh) -shallow marsh (alkaline & fresh) -alkali playa lakes (alkaline & fresh)	-shallow alkali playa lake -alkali bulrush marsh -natural hot springs -sand dunes	-shallow, semi-permanent fresh water marsh	-deep, permanent to semi-permanent fresh water marsh	-seasonal wet meadows -shallow fresh marsh -riparian -managed fresh water ponds
WILDLIFE	-shorebird, dabbler duck and sandhill crane production -shorebird maintenance	-shorebird maintenance -snowy plover production	-dabbler and diver duck production -Canada goose production	-colonial nesting birds (production & maintenance) -non-colonial bird over water nesting production -fall maintenance habitat (waterfowl & shorebirds)	-crane, trumpeter swan, and dabbler duck production -fall crane and waterfowl maintenance -colonial marsh bird maintenance -riparian migratory bird production & maintenance
PUBLIC USE	-scientific research -historic (Double O Ranch)	-scientific research -de facto wilderness	-scientific research	-wildlife observation/interpretation -environmental education -scientific research -waterfowl hunting	-wildlife interpretation & observation -scientific research -environmental Ed. -historic (P Ranch, Sodhouse)
LAND & WATER MANAGEMENT	-developmental	-non-developmental	-developmental	-non-developmental (developmental in headquarters area)	-developmental

- (k) Sanctuary: New public access opportunities will result in new impacts on refuge sanctuaries. Refuge regulations governing public use will be strict and will minimize impacts to wildlife and wildlife habitats through scheduling and zoning.
- (l) Sequence of Public Use: Public use will follow national and regional policy. Non-consumptive activities (wildlife observation, interpretation) will be emphasized over consumptive activities (hunting and fishing). Consumptive activities will emphasize quality (low user density, quietness, etc.) over quantity (maximized user density, artificial plantings of either birds or fish).
- (m) Economic Use: The present level of haying and grazing (40-60,000 AUMS/Year) will be maintained while the refuge staff develops habitat management plans for each unit. The HMP effort is scheduled to begin during 1985. If the HMP effort results in the need to increase or decrease economic use more than 10%, a separate Environmental Assessment will be prepared and subjected to a thorough public comment and involvement process and carefully coordinated with official citizens, officials and public agencies.
- (n) Public Acceptance: National and regional response to the Preferred Alternative is expected to be favorable. Some local response will be strongly adverse to any Master Plan alternative which does not make a commitment to a return to former levels of economic use, particularly haying and grazing.
- (o) Fiscal Analysis: The Preferred Alternative involves the highest level of management intensity of the three alternatives discussed in this plan, and its monetary requirements are summarized in Figure 15.

Figure 15 COST TALLY SHEET

Alternative: Preferred Refuge: Malheur DATE: 07/84

<u>OUTPUT/FACILITY/PROGRAM</u>	<u>CAPITAL EXPENDITURE</u>	<u>LIFE EXPECL.</u>	<u>OPERATIONS &amp; MAINTENANCE</u> <sup>(1)</sup>
Refuge Manager, GS-13, PFT			43,000
Asst. Refuge Mgr., GS-12, PFT			35,000
Wild. Mgt. Bio., GS-12, PFT			35,000
Asst. W. Mgt. Bio., GS-9, PFT			29,000
Asst. W. Mgt. Bio., GS-9, PFT			24,000
Off-Refuge (Harney Basin)			
Habitat Management Spec., GS-11, PFT			30,000
Public Use Spec., GS-9, PFT			24,000
Administrative Off., GS-6, PFT			18,000
Secretary, GS-5, PFT			16,000
Maintenance Leader, WL-9, PFT			30,000
Crane Operator, WG-10, PFT			29,000
Maint. Mechanic (P-Ranch), WG-9, PFT			24,000
Maint. Mechanic (OO), WG-9, PFT			24,000
Maint. Mechanic (BV), WG-9, PFT			24,000
Bio. Aid, GS-5, TPT, 12MM			16,000
Public Use Aid, GS-5, TPT, 3MM			7,000
Maint. Worker, WG-5, TPT, 24MM			35,000
Clerk Typist, GS-4, TPT, 6MM			6,000
SUBTOTAL			449,000
Administration/ Services			160,000
Maintenance <sup>(2)</sup>			
Buildings <sup>(3)</sup>	668,000	50	50,000
Structures/Improvements	--	50	100,000
Equipment	680,000	20	34,000
One time rehabilitation <sup>(4)</sup>	3,989,000	20	199,000
TOTAL	5,337,000		992,000

(1) Based on 1984 dollars.

(2) Includes cyclical (periodic) maintenance.

(3) See Refuge Project Description Worksheets 99-103, C104-108, and M 501-530 on file in refuge office.

(4) The one time rehabilitation needs identified would address the existing accumulated "back log" of maintenance and rehabilitation needs generated by inadequate funding levels to date. O&M and annualized cost based on 20 year planning period, for a total one time rehabilitation need of \$3,989,000. See next page for itemization.

Figure 15 (Continued)

## Itemized One Time Rehabilitation Needs:

Historic Buildings	35,000
Roofing (P Ranch & B.V.)	15,000
Buildings Rehab	280,000
H.Q. VCS	60,000
Env. Restoration	145,000
Landscaping	10,000
Corrals	5,000
Fences	1,084,000
Posting/Signs	60,000
Service Roads	300,000
Tour Routes/Boats Usage	200,000
Observation Tower	20,000
Other Rec. Roads	70,000
Bridges	100,000
Canals/Ditches	500,000
Dikes/Levees	400,000
Water Control Structures	185,000
Equipment Replacement	520,000
	3,989,000

Table 23. Summary of Output Levels Under Preferred Alternative

Outputs in Priority	Output Levels (long-range)
<b>RESOURCE MANAGEMENT</b>	
<b>ENDANGERED SPECIES</b>	
Peregrine Falcon P & M	9 nesting pairs
Bald Eagle M	6,500 use days
Rare & Endangered Plants	N/A
<b>ENVIRONMENT</b>	
Designated Sites	8
<b>MIGRATORY BIRDS</b>	
Greater Sandhill Crane P	150 birds
Greater Sandhill Crane M	250,000 use days
Trumpeter Swan P & M	30 produced/25,000 U/D
Swainson's Hawk P & M	5 nesting pairs
Ferruginous Hawk P & M	5 nesting pairs
Snowy Plover P & M	285 birds/67,000 U/D
White-faced Ibis P & M	1,600 birds/100,000 U/D
Snowy Egret P & M	450 birds/31,000 U/D
Black-crowned Night Heron P & M	1,700 birds/130,000 U/D
White Pelican P & M	540 birds/175,000 U/D
Bobolink P & M	? /500,000 U/D
Whistling Swan & Diver M	3,500,000 U/D
Goose P	3,000 birds
Goose M	1,666,000 U/D
Dabbler Duck P	50,000 birds
Dabbler Duck M	15,300,000 U/D
Diving Duck P	25,000 birds
Golden Eagle P & M	35 produced/3,600 U/D
Other Raptors P & M	§Maintain current
Other Shorebirds P & M	§ population and
Other Marsh & Waterbirds P & M	§ use levels.
<b>NON-MIGRATORY BIRDS</b>	
Upland Game Bird P & M	Maintain self-sustaining population
<b>MAMMALS</b>	
Large Mammal P & M	525 produced/140,000 U/D
Predatory Mammal P & M	Maintain self-sustaining population
<b>WILDLIFE DIVERSITY</b>	
Wildlife Diversity	Increase through re-introduction of endemic species.

P=Production M=Maintenance

Table 23. (cont.)

## PUBLIC USE MANAGEMENT

## EDUCATION

Outdoor Classrooms	10,000 A. H.
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## INTERPRETATION

Wildlife Trails, self-guiding (foot)	20,000 A. H.
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Wildlife Trails, self-guiding (vehicle)	200,000 A. H.
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## RECREATION, NONCONSUMPTIVE

Wildlife/Wildlands Observation (foot)	3,000 A. H.
---------------------------------------	-------------

Wildlife/Wildlands Observation (vehicle)	90,000 A. H.
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Wildlife/Wildlands Observation (boat-marsh)	1,600 A. H.
---	-------------

Photography	15,000 A. H.
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## RECREATION, CONSUMPTIVE

Hunting - General Waterfowl	8,000 A. H.
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Hunting - Upland Game	2,000 A. H.
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Fishing - Warm Water (bass)	5,000 A. H.
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Fishing - Cold Water (stream)	3,000 A. H.
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## 2. The No Funds Increase or Current Management Alternative

### a. Objective Documentation Records

The objective documentation process provided the basis for developing this alternative.

### b. Long-Range Management Strategy

The No Funds Increase or Current Management Alternative is predicated on the continuation of present funding trends on this refuge. Thus, the management strategy is to maintain the maximum output levels permitted by current funding levels. It is based on the assumption that future funding levels will be similar to present, with no significant increases to take care of the existing backlog of habitat and facility maintenance and rehabilitation needs, or to offset the effects of inflation.

While there would be no significant change in the type or priority of outputs, some changes would occur in refuge management in the form of reduced activity or management "intensity". Thus, over time, most current output levels would gradually decline.

If this alternative was adopted, most refuge facilities would show signs of major deterioration within five to ten years. Many facilities already need extensive rehabilitation. Furthermore, we would be forced to give up the assistant refuge manager (staff) position gained through the Bicentennial Land Heritage Program. By 1995, the station budget will have fallen so far behind as a result of inflationary effects that the staff will have been further reduced and many maintenance and management functions eliminated. It would then be impossible to provide water distribution vital to the habitat management program. Fence and road deterioration would lead to problems such as livestock trespass and significantly reduced visitor use.

It can also be assumed that many management functions would lose their effectiveness in the absence of an adequate biological staff. Grazing, haying, and prescribed burning could not be used with a proper understanding of their effects on plants and animals, nor could they be properly monitored. The economic use program could not be properly administered and would, therefore, have to be reduced. Thus, we would never be able to take full advantage of their potential benefits to wildlife. All off-refuge biological work such as the Harney Basin IRP would be dropped. This means waterfowl surveys, eagle production surveys, bald eagle counts, and breeding bird surveys in the Harney Basin would be discontinued.

The I&R program would suffer also. No new interpretive facilities (e.g. walking and canoe trails) could be developed or maintained, and the interpretive potential for the museum, Malheur Lake marsh, historic sites, etc. could not be realized.

Like the Preferred Alternative, this plan sets management direction by identifying specific management strategies for each planning unit. These will be the focus on which all management activities will be directed to produce outputs. Other information provided in the Preferred Alternative introduction relative to legal mandates and policy is applicable to this alternative.

The management "theme" for the No Funds Increase Alternative will be basically the same as the theme developed for the Preferred Alternative.

(1) Planning Unit I - Double-0

- (a) Habitat Management Strategy: Same as Preferred Alternative. Numbers of man-made ponds and acres of shallow marsh and wet meadow which are created by the water distribution system would gradually decrease because of lack of funds for maintenance of facilities and manpower to operate the system. The system would deteriorate to a point that it would be difficult to control the spread of water onto fields or to maintain water levels in ponds, and would result in bird production losses.
- (b) Wildlife Management Strategy: Same as Preferred Alternative. Production of these outputs would decrease over time as quality and quantity of habitat decreases. This would occur for the reason stated earlier.
- (c) Public Use Strategy: These strategies can function as outlined in the Preferred Alternative for a few years, but would be curtailed or halted in five to ten years because funding would not be adequate to properly protect the research natural area or maintain the Double-0 historic site. Furthermore, the historic site would deteriorate without maintenance under this alternative.
- (d) Land and Water Management Strategy: Land and water management in this unit has included extensive diking and non-developmental activities such as grazing, haying, and prescribed burning. Under the No Funds Increase Alternative, existing structures and facilities will be maintained so far as funding permits. No new development or major rehabilitation will occur. Non-developmental management techniques will be emphasized over intensive manipulative activities.

It should be noted that management "intensity" will be lower than under the Preferred Alternative. This would eventually mean lower output levels and forage available to support haying and grazing activities.

(2) Planning Unit II - Harney and Mud Lakes

- (a) Habitat Management Strategy: Same as Preferred Alternative.
- (b) Wildlife Management Strategy: Same as Preferred Alternative. Each of these outputs would probably decrease over time as the restricted budget forced reductions in fence maintenance and enforcement to control livestock trespass and human disturbance in nesting and maintenance areas.
- (c) Public Use Management Strategy: Same as Preferred Alternative. Lower intensity of management would result in less enforcement and protection of refuge resources. Damage to RNA and cultural resources would result.
- (d) Land and Water Management: Eventually, the water management system could not be maintained because of reduced management capability. The Mud Lake channel and dike would deteriorate and uncontrolled flooding would occur in some years. Water diversion capabilities for wet meadow irrigation which are present now would eventually be impaired or lost.

(3) Planning Unit III - Malheur Lake

- (a) Habitat Management Strategy: Same as Preferred Alternative. With funding cutbacks, use of grazing management as a tool would have to be phased out in favor of less costly techniques such as prescribed burning.
- (b) Wildlife Management Strategy: Same as Preferred Alternative. Lack of funding for carp control would be a reality under the No Funds Increase Alternative. Unless a drought occurred to reduce carp populations, a long-term reduction in waterfowl maintenance and production of overwater nesters would occur, since they are dependent on sago as a food source.
- (c) Public Use Management Strategy: Same as Preferred Alternative, except that no new development or major rehabilitation would occur. Existing facilities could not be maintained at Service standards over time. Public hunting program would have to be phased out.
- (d) Land and Water Management: Basically the same as the Preferred Alternative, but reduced management effort would lead to reduced effectiveness of management facilities such as fences, the Springer Dam, etc.

(4) Planning Units IV & V - Lower and Upper Blitzen Valley

- (a) Habitat Management Strategy: Same as Preferred Alternative. The capability to manage and maintain many elements of the water control system would be lost over time because of inadequate funding. This would lead to the loss of some ponds and wet meadows. The quality of wildlife cover would be negatively impacted in most of the valley. Likewise the haying and grazing program may also have to be scaled down as available forage decreases.
- (b) Wildlife Management Strategy: Same as Preferred Alternative. Wildlife outputs would decrease over time for the same reasons listed in section (a).
- (c) Public Use Management Strategy: Same as Preferred Alternative. There would be no new development under the No Funds Increase Alternative. Furthermore, all uses associated with the auto tour route and historic buildings would start to decline within five years and would be well below current levels in ten years. Inadequate funding would prevent proper road, sign, and building maintenance so that, eventually, some roads and historic sites would have to be closed to the public.
- (d) Land and Water Management Strategy: The Blitzen Valley was originally purchased to protect the Blitzen River water source for Malheur Lake. Conveyance of Blitzen River water to the lake will continue to be a primary management strategy.

The land and water management strategy for the valley will be developmental. Maintenance of existing facilities will continue in accordance with other themes, but a reduced level will not be adequate to allow continued use of all structures and improvements. There will be no new development or major rehabilitation in the Blitzen Valley under this alternative.

c. Summary of Output Levels

Most refuge outputs will decline over time under current refuge funding patterns. Outputs not listed here would probably not be significantly impacted by this alternative.

- (1) Bald Eagle Maintenance: A small decline might be expected as waterfowl maintenance and refuge enforcement capability decline, since present bald eagle numbers are dependent on waterfowl for a food source and the presence of refuge personnel for protection.

- (2) Designated Sites: Historical sites would eventually deteriorate and possibly be lost because funds would not be available for their restoration and maintenance. Research Natural Areas would be abused by livestock and human trespass, since fence maintenance and enforcement would have to be reduced.
- (3) Greater Sandhill Crane Production: Most of the greater sandhill cranes (50-75%) nesting in the Double-0 and Blitzen Valley would be adversely affected, and probably not produce young, because of fluctuating water levels or loss of water during the nesting season. Under current funding strategy, we would eventually be unable to repair or maintain most water control structures and would not have adequate personnel to effectively manipulate water.
- (4) Greater Sandhill Crane Maintenance: Crane maintenance use days would decrease by as much as 35% over the long-term because of reduced production and reduced grain crops. It would be difficult to keep dikes and canals adequately maintained to insure delivery of sufficient crop irrigation water to some fields. With reduced grain production, some birds would leave earlier for the California wintering grounds. The numbers of birds returning would be reduced because mortality is higher on the wintering area where shooting and powerlines pose dangers. The longer a bird is held at Malheur in the fall, the greater are its chances of survival to the nesting season.
- (5) Trumpeter Swan Production and Maintenance: As many as 50% of the nesting pairs would eventually be affected by a lack of water or water stability in their nesting territories, and average production would be reduced accordingly. The swans on Malheur Lake would probably be the only ones not directly affected.
- (6) Snowy Plover Production and Maintenance: Reduced production and maintenance of these birds could occur if livestock and people disturb the nesting areas on Harney Lake. This would happen as enforcement and fence maintenance capabilities are reduced over time.
- (7) Diving Duck Production: Lack of carp control would probably lead to reduced production of sago pondweed and eventual long-term reductions in diving duck production by as much as 75%.
- (8) Goose Production: The lack of maintenance of water management facilities and pond dikes would eventually lead to a reduction in goose production through loss of nesting and brood rearing habitat. Production could decline by 25%.

- (9) Goose Maintenance: This output would be affected for the same reasons as greater sandhill cranes - reduced production habitat and fewer grain fields to feed wintering birds. Some additional crop depredation problems could result on private land.
- (10) Dabbling Duck Production: Eventual loss of many ponds and irrigated meadows from inadequate maintenance of facilities would lead to reduced dabbling duck production. Nesting cover would diminish in quality for lack of water, and numbers of brood ponds would decrease.
- (11) Dabbling Duck Maintenance: Maintenance would be adversely impacted because of lost duck production and a reduction in cropland acreages.
- (12) Other Shorebird Production and Maintenance: Decline in production of 10-20% could occur over time as water distribution capabilities in the Double-0 Unit diminish with lack of maintenance.
- (13) Other Marsh and Water Birds: Without carp control to insure good sago pondweed production, birds such as grebes, terns, and gulls would gradually decline using Malheur Lake where most of their use days occur. Use days could decline by as much as 50%.
- (14) Wildlife/Wildlands Observation (Foot and Vehicle), Wildlife Trails (Foot and Vehicle), and Photography: These forms of public use would begin to decrease at current funding levels because of decreased capability for road, sign, and restroom facility maintenance. Within 10 years, use would probably decrease by 50%.
- (15) Hunting - General Waterfowl: Lack of road and sign maintenance would lead to the absence of this hunt within 10 years.

d. Environmental Consequences of The No Funds Increase Alternative

- (1) Habitat Diversity: Refuge lands will be managed with habitat diversity as a major objective. Habitat types will include permanent and semi-permanent ponds and marshes, irrigated meadows, brush covered uplands, riparian zones, rimrock, sand dunes, alkali flats, and others. The capability to maintain some ponds and irrigation facilities would be lost if the station budget remained at current levels.
- (2) Wildlife Diversity: Vertebrate species diversity should not decline under this alternative, except that bobolinks could be adversely affected to the point of elimination.

- (3) Energy Efficiency: Energy consumption would remain static or decrease slightly as new energy conservation measures are explored and old ones refined. With present funding patterns, there would eventually be a reduction in personnel and duties which would mean reduced energy use.
- (4) Ecological Quality: Ecological quality would probably decrease if the station budget isn't increased to meet the total maintenance and rehabilitation needs of the refuge. This would eventually occur because facilities could not be maintained and economic uses would be eliminated. Many ponds would be lost or would decline in size. In some cases, vegetation management would be halted and vegetation quality would decline. Grasses would form undesirable mats and bird nesting would be discouraged. We would not have the manpower to continue biological monitoring in the Harney Basin off-refuge and, therefore, would lack the baseline information necessary to provide effective input into local land use decisions.
- (5) Visual Quality: Visual quality should remain stable and would probably be classed as "moderate". This is because of the presence of fences, water management facilities, and livestock. Aesthetics will be considered when replacing fences and repairing or maintaining other facilities.
- (6) Structural Stability: Stability of existing buildings and structures would decrease as the base operating budget continued to be eroded by the effects of inflation.
- (7) Public Use Quality: Present quality of public use program is "fair", but the auto tour route is deteriorating and interpretive facilities at headquarters are minimal. The quality of these facilities and programs would seriously decline over time with this alternative.
- (8) Wildlife Population Quality: This would remain high for several years, but at current funding levels, the cooperative farming program and water control facilities could not be adequately maintained. As facilities deteriorate, sizeable numbers of bird use days and bird production would be lost through lack of habitat management capability.
- (9) Size and Shape of Refuge: The size of the refuge would not change significantly if the entire 3,788 acres of non-refuge inholdings were to be acquired, as it is anticipated that they would be acquired by exchange.
- (10) Access: No new access opportunities would be permitted, thus limiting public use opportunities.
- (11) Sanctuary: Additional sanctuary would result as economic use and public use programs were phased back.

- (12) Sequence of Public Use: Since some forms of public use would eventually be lost, priority would be given to maintaining non-consumptive uses.
- (13) Maintenance and Service: The current budget is not sufficient to permit adequate maintenance of all facilities. The size and complexity of this station make maintenance an expensive and time consuming task. It is estimated that it would take \$968,000 to address the existing backlog of maintenance and rehabilitation. At the Funds Increase Alternative level of funding, the existing maintenance deficit would continue to grow and a major deterioration in basic services would occur.
- (14) Economic Use: The present water and habitat management capabilities of the refuge would decrease due to deterioration of facilities and loss of personnel to operate programs. This will eventually effect the quantity and quality of forage on the refuge and would force a reduction in haying and grazing on the refuge. The magnitude of the resulting decrease in economic use could be large.
- (15) Public Acceptance: The aesthetically pleasing look of facilities at headquarters and various substations and the historical buildings have been popular with visitors. These could be expected to deteriorate at the present funding level, and evidence of this would result in public criticism, as would losses in wildlife numbers.
- Loss of economic uses under this alternative would also generate strong criticism at the local level.
- (16) Fiscal Analysis: The cost analysis of the Funds Increase Alternative that follows (Figure 16) is predicated on the continuation of present funding levels. However, as discussed earlier, there are major expenses associated with maintenance and rehabilitation of facilities and other aspects of the current program (e.g. biological monitoring) that are presently not being adequately met with current funding levels.

Table 24. Summary of Management Strategy or Themes by Refuge Planning Unit, No Funds Increase Alternative, as Compared to the Preferred Alternative.

Management Strategy or Theme	Unit I Double O	Unit II		Unit III Malheur Lake	Unit IV & V Blitzen Valley
		Harney Lake	Mud Lake		
HABITAT	Same as Preferred Alternative. But, reduced mgt. effort would cause reduction in acres of wet meadow & number of ponds. Could not maintain water levels in ponds.	No significant difference from Preferred Alternative.	Same. Reduced mgt. effort would lead to loss of water control & some negative impact on wet meadows.	Same as Preferred Alternative. Use of grazing on perimeter of lake would be discontinued.	Same as Preferred Alternative. Vegetation would be negatively impacted as a result of reduced mgt. effort. Water control facilities would deteriorate
115 WILDLIFE	Same as Preferred Alternative. Duck, crane, t. swan & shore bird prod. would decline because of lack of water control & reduced mgt. efforts.	Same as Preferred Alternative. All outputs may be reduced over time because budget would not be sufficient to provide protection for RNA.	Same as Preferred Alternative. Lack of carp control & water mgt. capability could lead to reduced dabbling duck production & maintenance.	Same as Preferred Alternative. No carp control would result in reduced waterfowl production and maintenance (diver ducks & swans).	Same as Preferred Alternative. However, wildlife outputs would decrease with reduced mgt. capability of water.
PUBLIC USE	Same as Preferred Alternative. Reduced public use because of lack of funds for historic site & sign maintenance and general program administration. Reduced mgt. effort would lead to lack of protection for RNA. No new development.	Same as Preferred Alternative. Lower intensity of mgt. would result in less enforcement. Damage to cultural resources & RNA would result. No new development would be planned.	Same as Preferred Alternative. Wildlife observation would be permitted & probably would not be affected. Research might be negatively impacted by livestock trespass resulting from lack of fence maintenance. No new development.	No new development. Hunting would be phased out because of reduced mgt. effort. Would lead to inadequate roads, signs, & fences & loss of enforcement capability. Trail at HQ would be lost.	Same as Preferred Alternative. But, roads signs & historic sites would eventually deteriorate with reduced mgt. effort & public use would decline.
LAND & WATER MANAGEMENT	Could not adequately maintain existing facilities. Would reduce mgt. intensity. All output levels would be reduced in 5-10 yrs. No new development	Same as Preferred Alternative, non-developmental.	Same as Preferred Alternative. Mud Lake dike & canal could not be maintained & some water mgt. capability would be lost. No new development.	No new development. Reduced mgt. effort would lead to loss of effectiveness of many developments (e.g. water control structures & fences.	Water mgt. capability would decline with mgt effort reduced. Some use of fire & grazing/haying would continue. No new development



Table 25. Summary of Output Levels under the No Funds Increase Alternative

<u>Outputs in Priority</u>	<u>1981 Output Levels</u>	<u>1995 Output Levels</u>
RESOURCE MANAGEMENT		
ENDANGERED SPECIES		
Peregrine Falcon P & M	unknown	no change
Bald Eagle M	1,175 UD	900 UD
Rare & Endangered Plants	unknown	no change
ENVIRONMENT		
Designated Sites	7 sites	7 sites
MIGRATORY BIRDS		
Greater Sandhill Crane P	32	15
Greater Sandhill Crane M	190,000 UD	142,000 UD
Trumpeter Swan P & M	15P/16,500 UD	8P/8,250 UD
Swainson's Hawk P & M	0P/unknown	no change
Snowy Plover P & M	170/48,000	100/40,000
White-faced Ibis P & M	1,400/99,000	no change
Snowy Egret P & M	250/22,000	300/25,000
Black-crowned Night Heron P & M	1,600/97,300	1,700/110,000
White Pelican P & M	124,000 UD	130,000 UD
Bobolink P & M	unknown	would decline
Whistling Swan & Diver M	4,670,000 UD	3,000,000 UD
Goose P	860	650
Goose M	1,666,388 UD	1,000,000 UD
Dabbler Duck P	32,000	20,000
Dabbler Duck M	10,370,000 UD	8,000,000 UD
Diving Duck P	19,800	5,000
Golden Eagle P & M	2 pair/N.A. UD	no change
Other Raptors P & M	unknown	no change
Other Shorebirds P & M	unknown	would decline
Other Marsh & Waterbirds P & M	1,240,000 UD	620,000 UD
NON-MIGRATORY BIRDS		
Upland Game Bird P & M	unknown	no change
MAMMALS		
Large Mammal P & M	575/140,000	500/130,000
Predatory Mammal P & M	unknown	no change
WILDLIFE DIVERSITY		
Wildlife Diversity	321 species	no change

P=Production M=Maintenance UD=Use days

Table 25 cont.

## PUBLIC USE MANAGEMENT

## EDUCATION

Outdoor Classrooms	2,790 AH	no change
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## INTERPRETATION

Wildlife Trails, (foot)	1,840 AH	900 AH
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Wildlife Trails, (vehicle)	91,000 AH	45,000 AH
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## RECREATION, NON/CONSUMPTIVE

Wildlife/Wildlands Obser. (foot)	1,670 AH	800 AH
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W/W Obser. (vehicle)	46,500 AH	23,000 AH
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W/W Obser. (boat-river)	60 AH	phase out
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W/W Obser. (boat-marsh)	not developed	
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Photography	572 AH	300 AH
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## RECREATION, CONSUMPTIVE

Hunting - General Waterfowl	4,280 AH	0 AH
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Hunting - Upland Game	900 AH	1,100 AH
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Fishing - Warm Water (bass)	895 AH	1,000 A
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### 3. The Custodial Maintenance or No Active Management Alternative

#### a. Objective Documentation Record

The objective documentation process also provided the basis for developing this alternative.

#### b. Long-Range Management Strategy

The basic strategy for the Custodial Maintenance Alternative is to protect the basic integrity of the refuge and associated water rights with minimum funding and manpower. The primary purpose of this alternative is to provide a minimum operating level against which the Preferred and No Active Alternatives can be compared. It also provides a useful assessment of that minimal operating level that could occur without jeopardizing refuge property and water rights, should future fiscal constraints dictate severe cutbacks in refuge operations.

Under this alternative, the refuge would be closed to all economic uses, i.e. grazing, haying, farming, and trapping. Public use would also cease. No hunting, fishing, interpretation, recreation, or research would be permitted.

Major effects on wildlife would occur as a result of drastically reduced water management. Virtually all water control structures would be left open to minimize damage from high spring flows to dikes, roads, and dams. Any damage incurred could not be repaired due to a lack of manpower and funds.

Water would essentially flow from the entire Blitzen River system directly into Malheur Lake. Some uncontrolled ponds and meadows would receive periodic wild flooding during major run-off periods as the rivers and streams would overflow. Most of the wetlands in the Blitzen Valley and the Double-0 Units would be rendered unsuitable for nesting migratory birds.

To avoid jeopardizing refuge water rights, water would have to be spread one out of every five years. If irrigation was not practiced at least once within a five-year period, other users could challenge refuge water rights and make application for them on the basis that they had been abandoned. Oregon water rights law permits this type of application.

A fifth of the refuge area to which water rights apply would be irrigated every fifth year. Water would be spread out in May and held until late June.

In addition, interior fences and roads would not be maintained. It is estimated that 300 miles of fences and 100 miles of roads would need major rehabilitation or replacement after a ten-year period without maintenance on Malheur NWR.

Biological activities would also cease. No censusing, research activities, or ecological monitoring would take place. Data continuity would cease. On a refuge with over 183,000 acres, little information could be compiled on bird numbers. It would even be difficult to estimate trends with only one professional on the staff.

Personnel would include the following: Two WG-9 PFT maintenance mechanics, one GS-11 PFT refuge manager, and two WG-5 TPT maintenance mechanics.

The two PFT maintenance mechanics would keep the exterior refuge boundary fenced and posted. They would also protect refuge buildings from severe deterioration (maintain windows, siding, roofs, foundations, etc.). They would also irrigate one-fifth of the refuge on a rotational basis to protect refuge water rights. This would be accomplished without maintenance to dikes, dams, etc. as much as possible. Water would be spread in May and held until late June.

Duties of the refuge manager would be largely enforcement oriented, which would involve livestock trespass, unauthorized public use, and preservation of refuge water rights. He would also be responsible for the supervision of the other employees and the over-all administration of the refuge program.

For planning purposes, it is assumed that fire suppression would continue to be handled by the Burns District, Bureau of Land Management. However, the refuge would be required to maintain an initial fire suppression "attack" capability. Two WG-5 maintenance mechanics would be hired for six months to satisfy this need. They would be assigned to boundary fencing and posting when not fighting fires.

A unit-by-unit discussion follows concerning the major effects under the custodial maintenance option.

(1) PLANNING UNIT 1: DOUBLE-0

- (a) Habitat Management Strategy: Wetlands would be dry the greater part of at least four out of five years. This would be the result of limited water management capabilities. Stinking Lake and the various natural springs would be the only wetlands not affected. Meadow and upland vegetation would be greatly reduced in density and height because of no treatment (e.g., prescribed fire, haying, grazing).
- (b) Wildlife Management Strategy: The primary wildlife species (shorebird, dabblers, greater sandhill cranes) would be negatively affected due to a lack of water, especially during the nesting season.

- (c) Public Use Management Strategy: No public use would be permitted. Scientific research, the primary public use theme in this unit, would not be permitted. The Double-0 Ranch historical site would also be closed to public use. Its condition could be expected to deteriorate over time.
- (d) Land and Water Management Strategy: All roads, dikes, ditches, water control structures, ponds, nesting islands, signs, and interior fences would receive no maintenance. Buildings would be protected on the exterior only.

No prescribed fire, haying, or grazing would be permitted. No noxious weed control would be practiced.

(2) PLANNING UNIT II: HARNEY AND MUD LAKES

- (a) Habitat Management Strategy: Mud Lake would not be flooded and maintained. Harney Lake would remain essentially as is. Uplands would also remain largely unchanged as little vegetation management is practiced in this unit.
- (b) Wildlife Management Strategy: Harney Lake's main wildlife outputs (shorebirds) would remain unchanged. Waterfowl production in the Mud Lake Unit would decline due to lack of water.
- (c) Public Use Management Strategy: No public use would be permitted, including scientific research (the main theme in this unit).
- (d) Land and Water Management Strategy: Little change would occur, as most of this unit is undeveloped and managed as a natural area. Funding would not be available to develop the Dunn Tract.

(3) PLANNING UNIT III: MALHEUR LAKE

- (a) Habitat Management Strategy: Malheur Lake is managed as a natural marsh. However, some undesirable changes in vegetative conditions and composition may occur with the exclusion of any form of plant treatment.

- (b) Wildlife Management Strategy: The main emphasis species in this unit are the overwater nesters (colonial birds, redheads, western grebes, terns, and canvasbacks). Their numbers would remain fairly static or decrease slightly over time as a result of the exclusion of fire.

Fall waterfowl use would suffer over time as carp would probably reduce the amount of submergents available for food.

- (c) Public Use Management Strategy: The primary use in this unit is interpretation and environmental education at refuge headquarters. This and all other public use would be phased out under this alternative. Scientific research would also not occur.

- (d) Land and Water Management Strategy: Management is generally non-developmental on Malheur Lake and would not change. One major change would be the curtailment of grazing. This would allow vegetation to deteriorate in height and density (nesting characteristics) over time.

(4) PLANNING UNIT IV AND V: BLITZEN VALLEY

- (a) Habitat Management Strategy: The primary habitat emphasis in these units is wetlands. Since water management would be very limited under this alternative, wetlands would be greatly reduced in these units. Water would only be spread one out of every five years to protect refuge water rights.

- (b) Wildlife Management Strategy: Greater sandhill cranes, trumpeter swans, dabbling ducks, riparian migratory birds, and marsh birds are the emphasized species in these units. All of these species are dependent on wetlands. Their use of the refuge would greatly decrease under the custodial alternative due to the reduction of wetlands.

- (c) Public Use Management Strategy: All public use would be terminated under this alternative. Primary uses affected are wildlife observation, interpretation, research, and environmental education.

- (d) Land and Water Management Strategy: Water and land management would virtually cease under this mode of operation. Water control structures would largely be left open, resulting in a drastic decline in wetlands. Grain farming, a major benefit to cranes and waterfowl, would cease. Again, irrigation would take place one out of every five years to protect refuge water rights.

Interior fences, dikes, canals, water control structures, roads, ponds, and interior signs would not be maintained. These facilities would gradually deteriorate.

No vegetation management (prescribed fire, haying, or grazing) would be permitted. Nesting cover would gradually decrease in productivity as a result. No noxious weed control would be practiced.

c. Summary of Output Levels

Several wildlife outputs and all of the public use outputs would either suffer severe declines or be entirely omitted under the Custodial Maintenance Alternative. Each output significantly affected will be discussed as listed in Table 27. Outputs reflect projections of custodial management levels.

- (1) Bald Eagle Maintenance: A small decline would be expected following the decline in waterfowl maintenance and, therefore, a reduction in their food source.
- (2) Greater Sandhill Crane Production: Nesting territories in the Blitzen Valley and Double-0 would not have suitable water due to the management strategy. Eighty percent of the pairs would be unable to nest successfully.
- (3) Greater Sandhill Crane Maintenance: Maintenance would be decreased to about one-third of the current level. This would be due to a lack of successful nesting pairs and grain fields, which would encourage them to move to the Central Valley of California about two months earlier. They are believed to suffer a much higher mortality on their California wintering area due to greater hunting pressure (illegal kills) and numerous powerlines.

Also, in the absence of refuge grain fields, crop depredation in nearby privately owned grain fields could be expected to increase, especially in the spring.

- (4) Trumpeter Swan Production and Maintenance: Eighty-five percent of the nesting pairs would be adversely affected by a lack of water in their territories. All pairs in the Blitzen Valley and Double-0 would be affected. Only the Malheur Lake pairs would have suitable nesting and brood water.
- (5) Colonial Water Birds: This group will not be affected greatly because they nest in Malheur Lake, which is a natural marsh. Water levels and food fish should still be available in Malheur Lake under this alternative.

- (6) Canada Goose Production: Again, lack of water in the Blitzen Valley and Double-0 would eliminate nesting in most of these areas. Malheur Lake would be the only major production area with adequate water for nesting and brooding.
- (7) Canada Goose Maintenance: Goose maintenance would be affected because of reduced production and also due to the lack of grain in the Blitzen Valley. Most of the goose maintenance under a custodial operation would accrue as geese fed on privately owned grain fields and used the refuge as a roosting area.
- Lack of grain production would result in poor distribution of geese in the Harney Basin and, most likely, greater crop depredation problems off the refuge.
- (8) Dabbling Duck Production: Dabbling production would be adversely affected by a lack of water in the Double-0 and Blitzen Valley. Vegetation would also be less dense and shorter due to a lack of treatment (prescribed fire, haying, and grazing).
- (9) Dabbling Duck Maintenance: These species would be affected in the same manner as Canada geese.
- (10) Other Shorebirds Production and Maintenance: The effects on specific output levels are unknown, but a large decline would be expected. Again, lack of water management in the Blitzen Valley and Double-0 would be the main reason for the decline.
- (11) Other Marsh and Waterbirds Production and Maintenance: Same as previous group.
- (12) Upland Game Bird Production and Maintenance: A small decline would be expected because of degraded nesting habitat and the lack of grain fields on the refuge. An increase would occur the first year as volunteer grain and weeds take over the grain fields.
- (13) Economic Use: All economic use would be ended under this alternative as suitable forage and water would be available to support haying and grazing programs.
- (14) Public Use: All public uses would be halted under the custodial regime. No interpretation or recreation would be permitted. This would eliminate wildlife observation, hunting, fishing, and the headquarters area activities.

Output levels under this alternative are summarized in Table 27.

d. Environmental Consequences of the Custodial Maintenance Alternative

Following is an evaluation of functional relationships and environmental impacts under this alternative.

- (1) Habitat Diversity: Number of species would decline due to lack of vegetation and water management. Vegetation would become more monotypic without treatment as time elapsed. Number of ponds and acreage of meadows would decrease with the lack of water management. Some willow stands would die out in the absence of water in all canals and ditches. The most severe effect would be the lack of flooded meadows during the bird nesting and brooding season.
- (2) Wildlife Diversity: Vertebrate species would possibly be eliminated on the refuge in the absence of vegetation management.
- (3) Energy Efficiency: This alternative would save fuel, electricity, and materials.
- (4) Ecological Quality: Vegetative growth would take on a more monotypic form without manipulation. Eutrophication would remain unchecked in the ponds.
- (5) Visual Quality: No major changes; however, habitat diversity and wildlife numbers could be expected to decline moderately.
- (6) Structural Stability: Many refuge facilities would experience significant deterioration. Dams, dikes, canals, roads, and fences would be especially vulnerable to floods, rodent activity, and general weather effects. Buildings would also deteriorate as a result of weather and rodent (inside) activity.
- (7) Public Use Quality: No facilities or activities would be provided for the public. Public use would cease, and public interest in and support for the refuge program would decline immensely, as public use opportunities were eliminated, and the refuge closed to public access.
- (8) Wildlife Populations Quality: Many species would suffer severe declines, some to the extent that flyway populations would be jeopardized. Especially hard hit would be trumpeter swans, bobolinks, and greater sandhill cranes. Dabblers, shorebirds, and marsh and waterbirds would also decline significantly.
- (9) Size and Shape of Refuge: No new acquisitions. Refuge acreage would remain unchanged.
- (10) Access: The entire refuge would be closed to the public.

- (11) Sanctuary: The refuge would be entirely protected as a sanctuary. No hunting, fishing, or other public use would be allowed.
- (12) Sequence of Public Use: None would occur.
- (13) Economic Use: The resulting loss of forage would result in the virtual elimination of the present haying and grazing program.
- (14) Public Acceptance: A large, adverse public reaction could be expected as a result of this alternative. Local ranchers would be adamantly opposed to loss of their economic use. Birders in Oregon and the United States generally would be expected to take the government to task over this alternative also. Local hunters and fishermen would also be violently opposed to a custodial level of management.
- (15) Fiscal Analysis: Salary and maintenance costs would be the lowest of all the alternatives (see figure 17).

Table 26. Summary of Strategy or Themes by Refuge Planning Unit for the Custodial Management Alternative, as Compared to the Preferred Alternative.

	Unit I	Unit II		Unit III	Unit IV & V
	Double O	Harney Lake	Mud Lake	Malheur Lake	Blitzen Valley
HABITAT	Vegetation would be negatively affected (density & height) due to lack of treatment. Water would be spread only once every five years on meadows.	No significant difference.	Vegetation would be negatively affected (density & height) due to lack of treatment. Water would be spread only once every five years on meadows.	Vegetation would be negatively affected (density & height) due to lack of treatment.	Vegetation would be negatively affected (density & height) due to lack of treatment. Water would be spread only once every five years on meadows.
127 WILDLIFE	T. swan, crane, Canada goose & dabbling production would drop to near zero, due to lack of timely water	No significant difference	Dabbling production affected negatively. Waterfowl maintenance severely affected due to lack of carp control resulting in poor feeding conditions	Dabbling production affected negatively. Waterfowl maintenance severely affected due to lack of carp control resulting in poor feeding conditions,	T. Swan, Crane, C. goose & dabbling production would drop to near zero, due to lack of timely water
PUBLIC USE	No public use or research, and no entry to RNA.	No public use. No entry to RNA, for research or educational purposes.	No public use or research.	No public use or research	No public use.
LAND & WATER MANAGEMENT	No vegetation management. Water management only once every 5 years. No facilities maintenance, except for exterior of buildings, boundary fences & Posting	No facilities maintenance, except as noted under Unit I.	No vegetation management. Water management only once every 5 years.	No vegetation management. No facilities maintenance, except as noted under Unit I.	No vegetation management. Water management only once every 5 years. No facilities maintenance, except as noted under Unit I.

Figure 17. COST TALLY SHEETAlternative: Custodial Maintenance    Refuge: Malheur    Date: 07/84

<u>OUTPUT/FACILITY/PROGRAM</u>	<u>OPERATIONS &amp; MAINTENANCE</u>
Refuge Manager, GS-11, PFT	30,000
Maint. Mechanic, WG-9, PFT	24,000
Maint. Mechanic, WG-9, PFT	24,000
Maint. Mechanic, WG-5, TPT, 6mm	8,500
Maint. Mechanic, WG-5, TPT, 6mm	8,500
Clerk-typist, GS-3, TPT, 3mm	3,000
Administrative/services	26,000
Buildings	10,000
Structures/Improvements	20,000
Equipment	15,000
TOTAL	169,000

Table 27. Summary of Output Levels under Custodial Maintenance Alternative.

RESOURCE MANAGEMENT	Custodial Maintenance Level (10 years into Program)
<u>ENDANGERED SPECIES</u>	
Peregrine Falcon Production & Maintenance	None
Bald Eagle Maintenance	Small decline
Rare & Endangered Plants	Unknown
<u>ENVIRONMENT</u>	
Designated Sites	5
<u>MIGRATORY BIRDS</u>	
Greater Sandhill Crane Production	5
Greater Sandhill Crane Maintenance	75,000
Trumpeter Swan Production & Maintenance	Prod. 2-3,000
Swainson's Hawk Production & Maintenance	None
Ferruginous Hawk Production & Maintenance	None
Snowy Plover Production & Maintenance	"
White-faced Ibis Production & Maintenance	"
Snowy Egret Production & Maintenance	"
Black-crowned Night Heron Production & Maintenance	"
White Pelican Production & Maintenance	"
Bobolink Production & Maintenance	Severe decline
Whistling Swan & Diver Maintenance	Small decline
Goose Production	300
Goose Maintenance	500,000
Dabbling Duck Production	7,000
Dabbling Duck Maintenance	2,500,000
Diving Duck Production	Small decline
Golden Eagle Production & Maintenance	Similar
Other Raptors Production & Maintenance	"
Other Shorebirds Production & Maintenance	Large decline
Other Marsh & Waterbirds Production & Maintenance	"
<u>NON-MIGRATORY BIRDS</u>	
Upland Game Bird Production & Maintenance	Small decline
<u>MAMMALS</u>	
Large Mammal Production & Maintenance	Moderate increase
Predatory Mammal Production & Maintenance	Moderate increase
<u>WILDLIFE DIVERSITY</u>	
Wildlife Diversity	Small decline

Table 27. (cont.)

	<u>OUTPUT LEVEL 10 YEARS INTO PROGRAM</u>
PUBLIC USE MANAGEMENT	
EDUCATION	
Outdoor Classrooms	0
INTERPRETATION	
Wildlife Trails, self-guiding (foot)	0
Wildlife Trails, self-guiding (vehicle)	0
RECREATION, NONCONSUMPTIVE	
Wildlife/Wildlands Observation (foot)	0
Wildlife/Wildlands Observation (vehicle)	0
Wildlife/Wildlands Observation (boat-river)	0
Wildlife/Wildlands Observation (boat-marsh)	0
Photography	0
RECREATION, CONSUMPTIVE	
Hunting - General Waterfowl	0
Hunting - Upland Game	0
Hunting - Deer-Bow	0
Fishing - Warm Water (bass)	0
Fishing - Cold Water (stream)	0

Table 28. Comparison Chart of 1991 Outputs and Costs Inherent in the Three Management Alternatives

OUTPUT	UNIT OF MEASURE	PREFERRED	NO ACTION	CUSTODIAL
RESOURCE MANAGEMENT				
ENDANGERED SPECIES				
Peregrine Falcon	#	9	N/C	None
Bald Eagle	UD	6,500	900	Small Drop
Rare & Endangered Plants	No Species	No Charge	N/C	Unknown
ENVIROMENT				
Designated Sites	#	8	7	5
MIGRATORY BIRDS				
G. Sandhill Crane	#	150	15	5
G. Sandhill Crane	UD	250,000	142,000	75,000
Trumpeter Swan	#/UD	30/25,000	8/8,250	2/3,000
White Faced Ibis	#/UD	1,600/100,000	300/25,000	Similar to No Action
Snowy Egret	#/UD	450/ 36,000	300/25,000	"
B-crowned Night Heron	#/UD	1700/130,000	1700/110,000	"
White Pelican	#/UD	540/175,000	0/130,000	"
W. Swan & Diver	UD	3,500,000	300,000	Small Drop from no action
Diving Duck	#	25,000	5,000	"
Dabbler Duck	#	50,000	20,000	7,000
Goose	#	3,000	650	300
Goose	UD	1,666,000	1,000,000	500,000
Dabbler Duck	UD	15,300,000	8,000,000	2.5M
Other Marsh & Waterbirds	#/UD	Maintain Current Levels	620,000	Large Drop
Other Shorebirds	#/UD	Maintain Current Levels	Would Decline	Large Drop
Other Raptors	#/UD	Maintain	No Charge	No Charge
Swainson's Hawk	#	5	No Charge	0
Ferruginous Hawk	#	5	No Charge	0
Golden Eagle	#/UD	35/3,600	No Charge	Similar to No Action
Snowy Plover	#/UD	285/67,500	100/40,000	100/40,000
Bobolink	#/UD	3/500,000	Would Decline	Severe Drop
Upland Game Bird	#/UD	Maintains Self-Sustaining Pop.	No Charge	Small Drop
Large Mammal	#/UD	525/140,000	500/120,000	Moderate Increase
Predatory Mammal	#/UD	Maintain Self Sustaining Pop.	No Charge	"
Wildlife Diversity	#	Increase thru Reintroduction of Endemic Spec.	321	Small Drop

Table 28. (cont.)

<u>OUTPUT</u>	<u>UNIT</u>	<u>PREFERRED</u>	<u>NO ACTION</u>	<u>CUSTODIAL</u>
PUBLIC USE MANAGEMENT				
Outdoor Classroom	AH	10,000	2,790	0
Wildlife Trails (Self-guide, foot)	AH	20,000	900	0
Wildlife Trails (Self-guide, vehicle)	AH	200,000	45,000	0
REC-NONCONSUMPTIVE				
Observation-Foot	AH	3,000	800	0
Observation-Vehicle	AH	90,000	23,000	0
Observ.-Boat, River	AH	1,600	Phase Out	0
Obser.-Boat, Marsh	AH	Develop Quality Program	Not Developed	0
Obser.-Photography	AH	15,000	300	0
Recreation-Consumptive				
Hunting-Waterfowl	AH	8,000	0	0
Hunting-Upland Game	AH	2,000	1,100	0
Fishing-Warm Water	AH	5,000	1,000	0
Fishing-Cold Water	AH	3,000	1,000	0
Annual O&M Dollars		992,000	558,000	169,000

IV. CONSULTATION AND COORDINATION WITH OTHERS

The draft master plan was subject to extensive in-house review. To simplify the process for others the important portions of the plan were condensed into a brochure titled Planning for the Future, Malheur National Wildlife Refuge. Copies of the draft plan were made available to anyone with an interest in reviewing the entire document.

Five comments were received during the public comment period. Most of the comments were in favor of the preferred alternative. Following the suggestion of the Society For Range Management, many of the documentation sections were removed from the plan and placed in Appendices, and wherever possible the structure of the plan was changed to make it easier to read.

